VOL. XXVIII. No. 6 JUNE 1943

MECCANO MAGAZINE

AN INGOT CHARGING MACHINE

(See Page 183)

6D.

Next Month: THE AIR TRANSPORT AUXILIARY. Ready: 1st July

MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

Vol. XXVIII
No.
June 1943

With the Editor

New Series of Articles

The first instalment of "*Forty-five years of Railway Photography*" reminds us of the tremendous development in camera construction during that period. The author, Mr. H. Gordon Tidey, has for many years held a prominent place among railway photographers, and his hints on making the best of a cheap camera are worth careful attention. In further articles he will bring his story up to the outbreak of the present war.

In another series of articles beginning this month, Mr. D. Rebbeck, an engineer who has made a close study of Diesel engines at home and abroad, tells us how these engines have been adapted to railway working. He describes the way in which the Diesel engine works, how the power is produced and transmitted to the driving wheels, and then passes on to give interesting details of Diesel-engined locomotives in actual service and of famous trains operated by them.

* * * *

Our cover this month gives an interesting glimpse of a steelworks interior and shows one of the many remarkable machines that have been designed to speed-up operations.

Leaders in the War

Lieut.-Gen. K. A. N. Anderson

Lieutenant-General Anderson was born on Christmas Day 1891, and educated at Charterhouse and the Royal Military College, Sandhurst. He began his military career in 1911 as a 2nd Lieut. in the Seaforth Highlanders, and served with them in India, that year, and in France in 1914–18. After that war he was with the Scottish Horse for four years, but rejoined the Seaforth Highlanders in 1924, and for the second time went with them to India. His long association with this regiment ended after he and his battalion were transferred to Palestine, where he was made Officer Commanding British troops at Haifa. Eventually he returned to India, this time as Colonel in the 4th Indian Division. He came back to England in 1937.

Lieutenant-General K. A. N. Anderson, C.B., M.C.

In the present war he was in France with the 11th Infantry Brigade. In April 1942 he became G.O.C. Eastern Command, and a few months later was transferred to command of the British First Army, which arrived in North Africa in November 1942. We are all familiar with the part played by the First Army in the defeat of the Axis forces in North Africa.

New Electric Shunting Locomotives

A NEW shunting locomotive has recently been supplied by the Metropolitan-Vickers Electrical Co. Ltd., for handling the coal and other wagons in the sidings of a large power station. These sidings were electrified some twenty years ago, and the original locomotive is still in service. The track facilities have now been modernised and enlarged.

The new locomotive, required to cope with the increased duties, is of a two-axle, steeple-cab design, weighing 17 tons in working order. Part of this weight is provided by sand ballast accommodated in the sloping ends of the cab. The track gauge is the British standard gauge of 4 ft. 8½ in., and the wagons handled are also standard in coupling and buffer arrangements. The supply is 500 volts d.c. from an overhead trolley wire of such height as to necessitate a structure on the cab roof for raising the base of the trolley collector, which is of standard swivel type with wheel contact. The appearance of the locomotive is seen in the upper photograph.

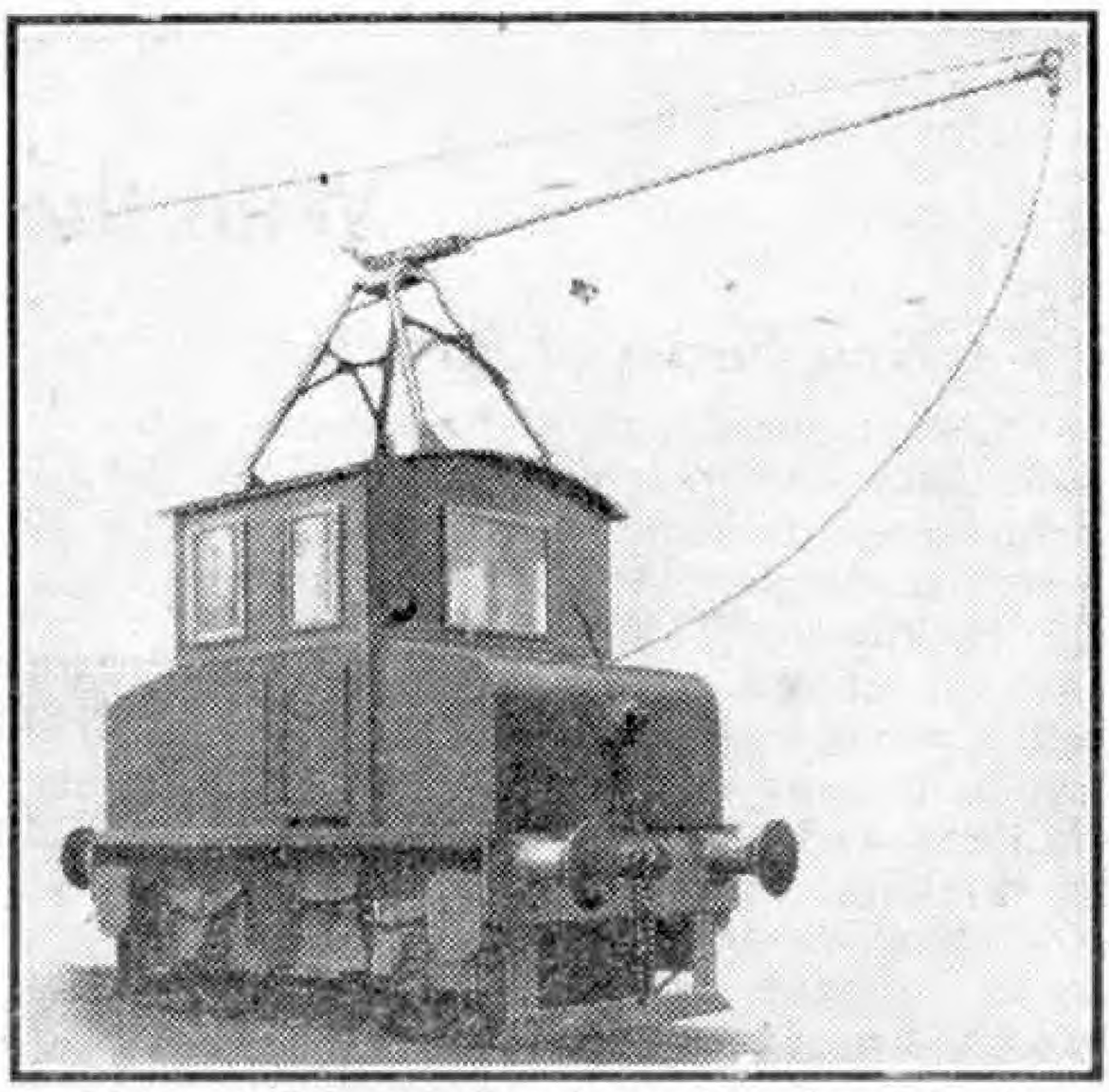
The drive is effected by two axle-mounted railway motors driving wheels of 37 in. diameter through single reduction gears of 13/85 ratio. The motors are totally-enclosed, with an hourly rating each of 38 h.p. They are operated in series-parallel in the ordinary manner by a standard cam-operated contactor type tramcar controller. This provides two economical running speeds, in addition to four other notches in series and three in parallel. On the braking side, seven notches of rheostatic braking are provided. The starting resistances, of the grid type, are located on the underframe below the sloping ends. The remaining details, comprising circuit-breakers, lightning arresters and lighting equipment, are mounted, with the controller, in the driver's cab. Sanding arrangements and hand brakes are provided.

The locomotive can handle four loaded 10-ton wagons on gradients up to 1 in 25.

Two small shunting locomotives have been put into commission at an oil refinery to supplement three other locomotives supplied by the Metropolitan-Vickers Company—one of them as far back as 1902.

These locomotives are of interest in that novel dispositions are required to suit the narrow gauge of 2 ft. 6 in. On this gauge the normal axle-mounted motor arrangements are not readily achieved, and therefore a special design of drive, sometimes called the "Scotch yoke" drive, has been adopted, as outlined below. The power supply is at 500/550 volts d.c. through an overhead trolley line.

The new locomotives are of two-axle type, each weighing 12 tons in working order. The drive consists

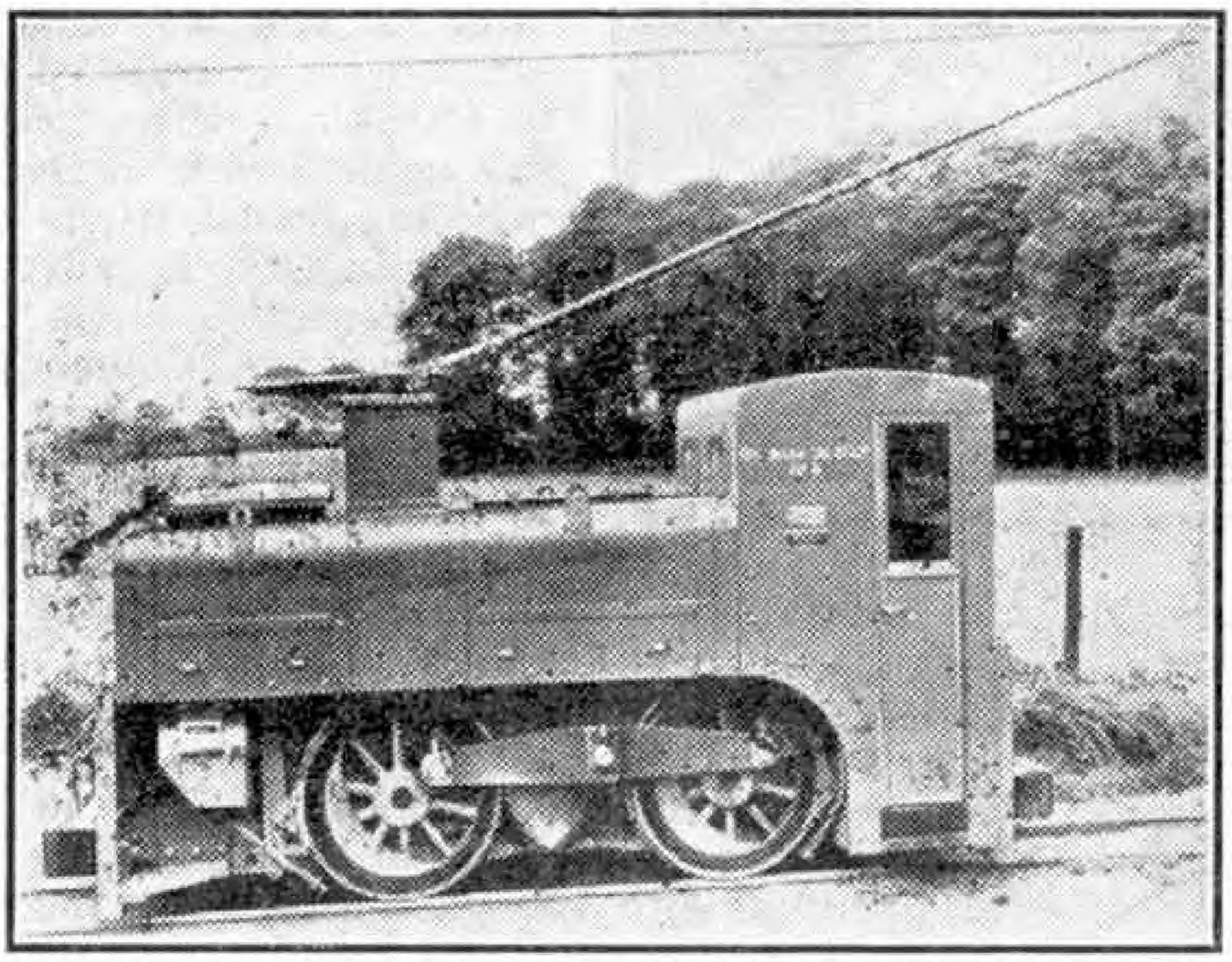


A 17-ton trolley shunting locomotive for duty in a large power station. Photographs by courtesy of "The Metropolitan-Vickers Gazette."

of a single traction motor, mounted rigidly on the locomotive framing in a transverse direction, transmitting through double-reduction gearing to a jackshaft that actuates on both sides of the locomotive, the side beams coupling the driving wheels. The gears are arranged centrally, and form with their bearings and casings a complete totally-enclosed unit between the locomotive frames. The jackshaft, carrying the second reduction gear wheel, is arranged with cranks at the outer ends. Pins, fitted to these cranks, run in bearings at the centre of the side beams, and these transmit the driving effort through the crank pins on the road wheels. These central bearings on the side beams are arranged with top and bottom clearance to compensate for any variation in the alignment with the road wheels when running. The total gear reduction is 18 to 1, and the driving wheels are 36 in. in diameter. All bearings, including those on the main axles and the motor shaft, are of the roller type.

The motor has a nominal rating of 72 h.p. at 500 volts. It is operated by a drum type controller having nine notches in both forward and reverse, so that a smooth start is obtained under all conditions of loading. The usual detail comprising starting resistances, circuit breakers and lighting equipment, is included. Hand brakes and wheel sanding arrangements have been incorporated.

Another factor influencing considerably the design (*Continued on page 214*)



A 12-ton, 2 ft. 6 in. gauge shunting locomotive with "Scotch yoke" drive.

Ingot Handling in the Steelworks

Stripping and Charging Machines

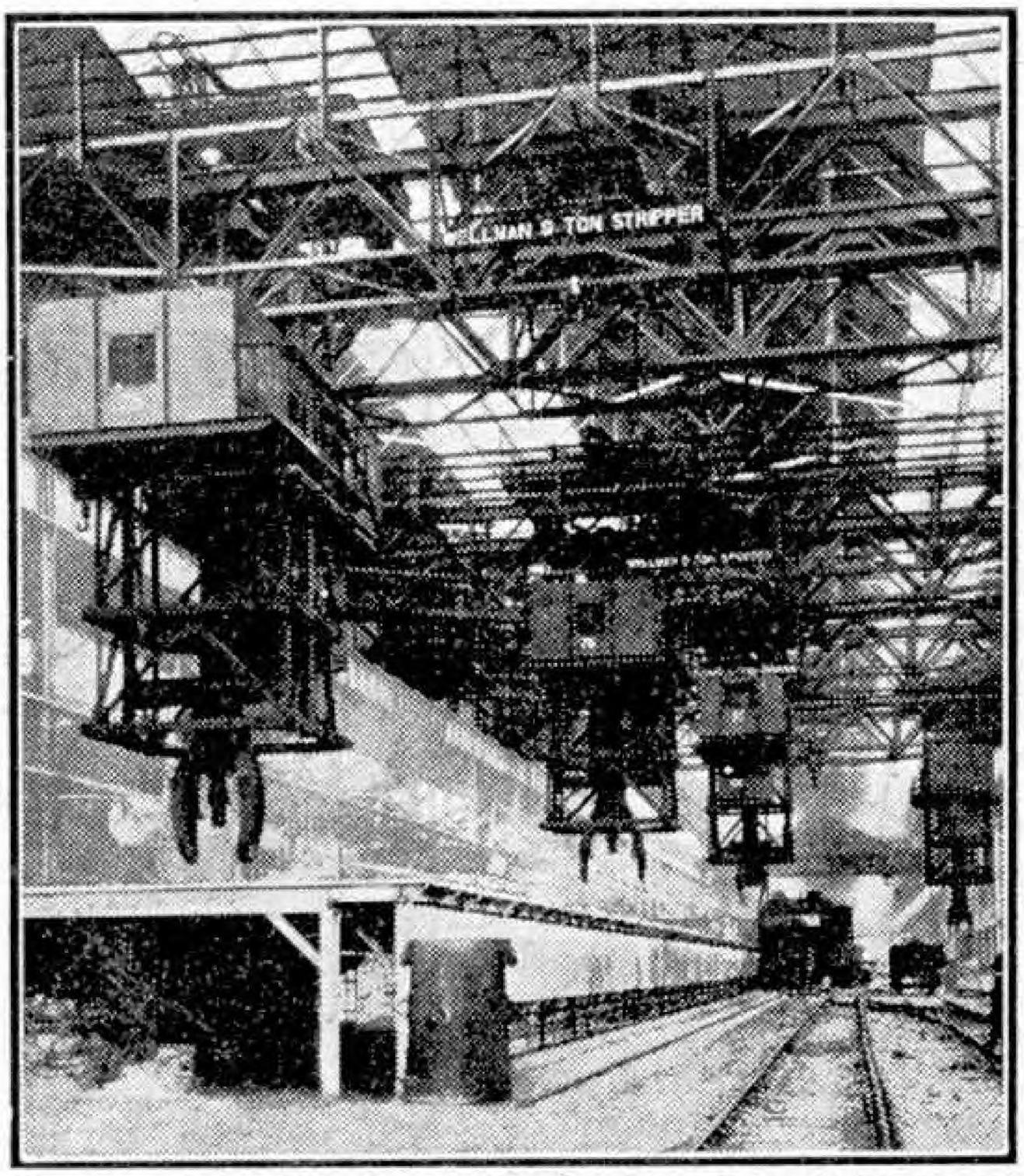
OUR cover this month, reproduced by courtesy of The Wellman Smith Owen Engineering Corporation Ltd., shows one of the many interesting machines that are employed for handling materials in a modern steelworks. The particular machine shown on the cover is a Wellman ingot charger, and in order to understand its special functions we must consider very briefly the principal process of steel manufacture.

In what is known as the open hearth process, pig iron and steel scrap, with small quantities of limestone and ore, are melted in a huge furnace, sometimes holding over 300 tons. In this type of furnace the melting chamber consists of a hearth open to the action of the flame, in contrast with the pear-shaped form of the Bessemer converter. After a number of hours in the molten state the metal is tapped from the furnace and poured into hematite iron moulds to form ingots, which may weigh anything from two to 230 tons—the largest yet cast in this country. In the background of the cover picture will be seen a row of 4-ton ingot moulds. When the molten metal has cooled and become a solid block, the mould is lifted by an ingot stripping machine, which by the use of great pressure, forces the ingot out of its mould.

Now the Wellman charger comes into operation. This machine, the upper part of which consists of a huge bridge mounted on wheels, traverses the whole length of the steelworks building. It is driven by electric motors like a crane, and the steel structure that depends from the travelling bridge carries large electrically-operated tongs. These tongs grip the ingot, lift it, and place it in the soaking pit. This is a vertical furnace consisting of a rectangular chamber fired by gas, and the ingot remains in it until it is penetrated or soaked evenly throughout to a temperature suitable for rolling.

When the ingot is ready, the same machine removes it from the soaking pit and conveys it to the rolling mill shop.

The Wellman charger is equipped with a device for lifting the covers from the soaking pits, as will be seen in the picture. It has also a 10-ton crane trolley operating from the travelling bridge, and this can be used for many purposes in the steelworks. The 10-ton hook with wire rope is seen in the upper left-hand corner of the picture.



Two 9-ton Ingot Stripping Machines and two 9-ton Vertical Ingot Charging Machines in a large South Wales steelworks. Photograph by courtesy of Wellman Smith Owen Engineering Corporation Ltd.

The illustration on this page shows two 9-ton ingot stripping machines and in the background two 9-ton vertical ingot chargers operating in a large steelworks recently built in South Wales. This illustration is of particular interest as it clearly shows in the stripping machines the tongs that engage on the spuds on the side of the ingot mould, and the ram that descends on to the top of the ingot to force it out of the bottom of the mould.

Forty-Five Years of Railway Photography

I.—My Early Cameras

By H. Gordon Tidey

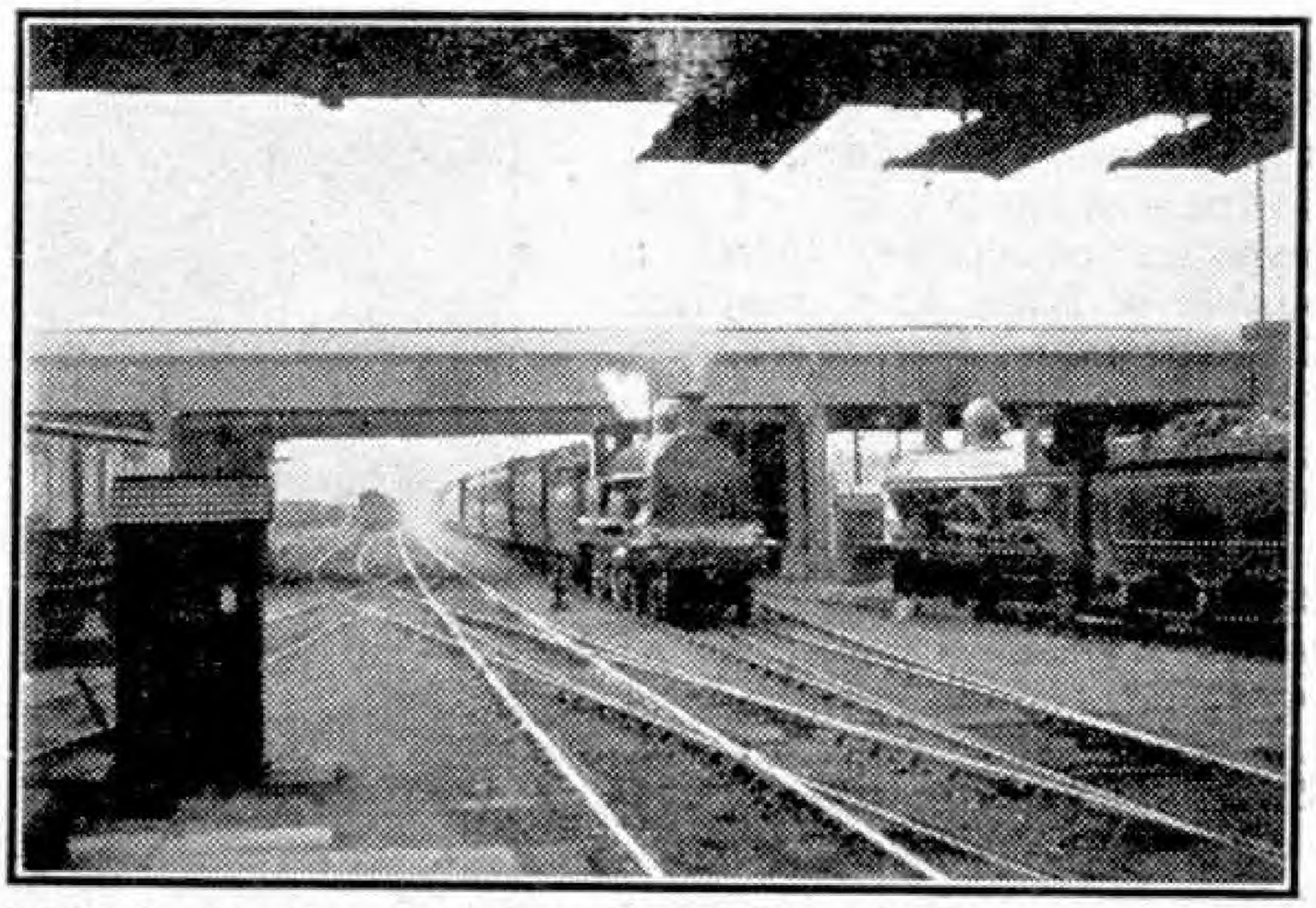
IT will, no doubt, be conceded that every small boy, from the age when he first begins to take notice, is fascinated by the locomotive, and one imagines that this has been so ever since the inception of railways. As he grows up he either loses his interest or else retains and nourishes it, in which case he eventually becomes a "Railwayist"—an object of never-ending wonder (not unmixed with amusement) to those who have discarded their earlier allegiance.

I must confess that at the present time, and looking back on quite a respectable number of years, my interest is still as great as it was on the occasion when, on giving my Mother the slip, I was eventually found on the platform at Norwood Junction intently studying the "innards" of a Stroudley D1 class 0–4–2 tank! As I was then aged about six it is hardly to be supposed that my investigations suggested any marked improvement on these capable little engines, which to this day remain such a monument to the genius of their designer William Stroudley.

It occurs to me that after so many years, of which much of my spare time has been given to the photography of trains in motion and locomotives, a review of some of my experiences may be acceptable to readers of the "*M.M.*," of which the study of railways forms an important section.

In very early days I felt the urge to record, by means of photography, the thrilling spectacle of a crack express, hauled by a locomotive which, in those days, was kept in spotless condition, with all the splendour of clean paint and burnished brass and steel work. Not having the means at my disposal to acquire an apparatus at all suitable to such exacting work, I wasted much time and expensive material in fruitless endeavours before realising that I must modify my ambitions and keep within the capabilities of such outfits as I could afford. The miniature camera was then unheard of, although at the present time (and for those who can afford it) it has been developed to an extent which renders it capable of turning out work second to none, and the results can be enlarged to any reasonable size provided a first-class lens is fitted to the camera. However, my personal preference is for a camera giving a picture of ½-plate or 6 by 4 size, which, although cumbersome to carry, obviates enlarging, a consideration when a number of prints have to be made from one negative.

My first efforts were made with ¼-plate box cameras of various sorts, most of which were loaded with plates in sheaths, and had shutters operated by elastic bands or springs, giving an exposure which was at all times problematical. The changing of plates, although worked on a system which had every appearance of being reliable, was actually in practice very much the reverse, usually allowing several plates to fall down at one operation, with the result that one never actually knew how many remained, nor which of those released had been exposed. Needless to say, my results with these cameras, of which I had several at different times,



L.N.W.R.: Up Liverpool express hauled by 4-cylinder compound 4-4-0 "Empress." On right is a 2-4-0 "Dreadnought" class 3-cylinder compound.

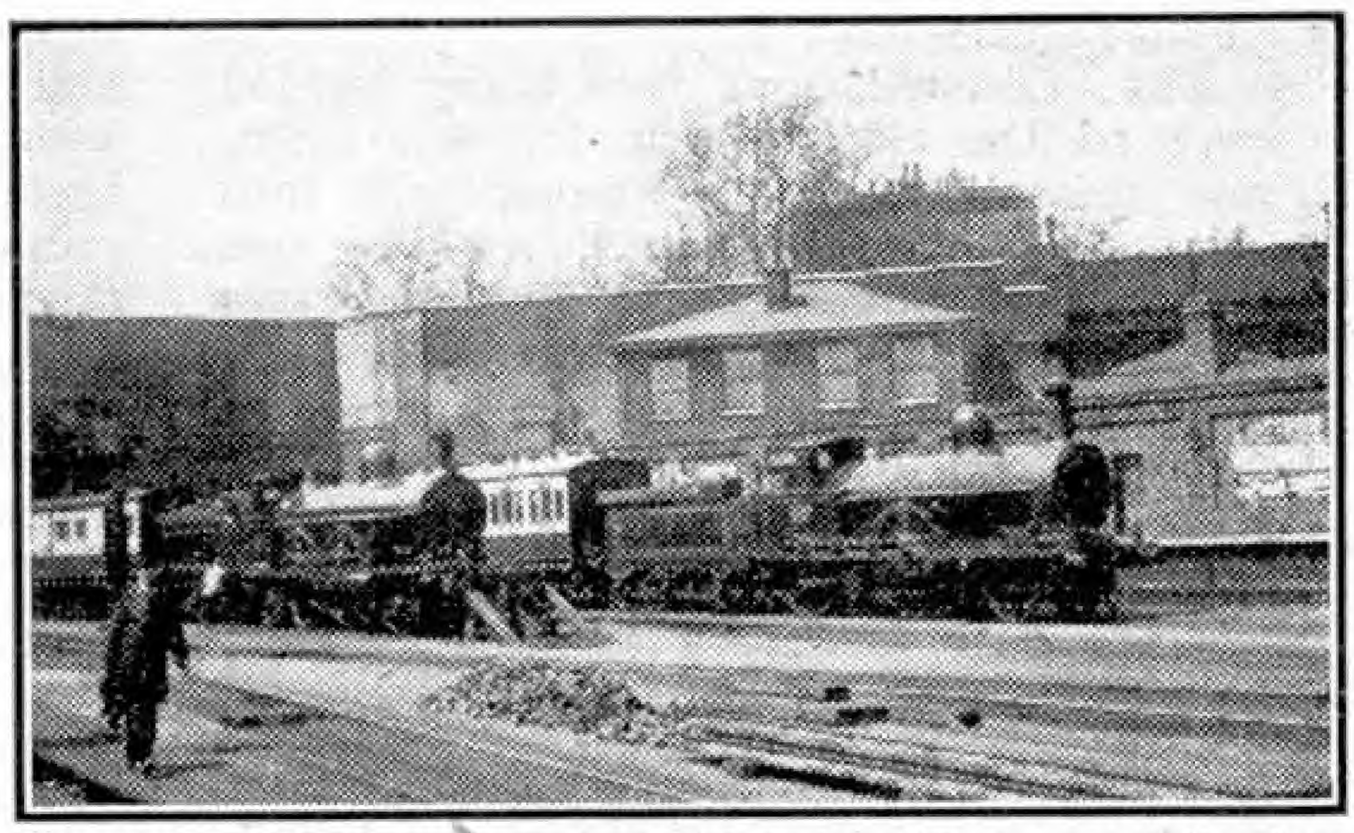
were not up to reproduction standard, although I can remember they afforded me quite a lot of enjoyment.

The first really efficient instrument I owned was one known as a "Cyclist's Gem." This was a hand camera fitted with a focussing front and a rapid rectilinear lens working at F8, and had a spring shutter giving speeds which were alleged to be 1/25, 1/50 and 1/100. This, of its kind, was really a very useful little instrument, with which I managed to turn out some quite passable results, the highest shutter speed being fast enough to render a train, if not travelling faster than about 45 m.p.h., sufficiently sharp for ordinary purposes. It must of course be remembered that, in those days, a plate of 250 H & D was an "ultra rapid," whilst a lens of a larger aperture than F8 was a luxury far beyond the capacity of pocket possessed by the average small boy. On glancing through some of the work I turned out during this period I am invariably surprised at the quality of the results, when taking into account the limitations of the camera, coupled with slowness of lens and plates. No doubt the secret lies in the fact that these slow plates had a vastly greater latitude, and therefore did not suffer so much owing to inevitable under-exposure.

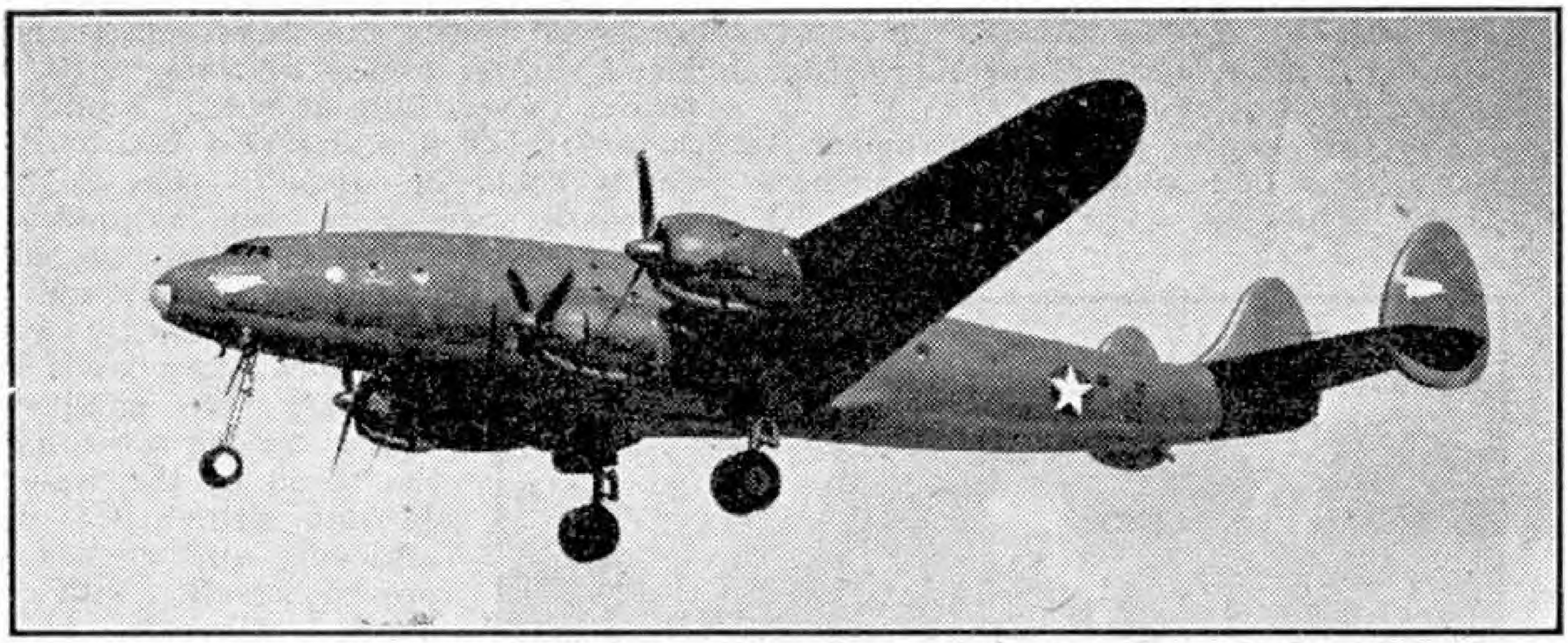
G.N.R.: 4-2-2 "Stirling" single No. 1007.

I was perforce content with this outfit for a considerable time, but after much consideration, coupled with a lengthy period of rigid economy (helped out by relatives), I next purchased a simple tripod camera, having the luxury of a focussing screen and dark slides, and a metal shutter of the revolving type, the motive power being an elastic band. One advantage of this was that two or more bands could be used to give a faster exposure, but there was naturally no means of telling the length of such exposure, and one could only judge by experiment how many bands were necessary, the number of course varying according to the speed of the train. I cannot remember ever achieving any greatly improved results with this outfit, although I got through a very considerable amount of material.

It would be, I suppose, about 1904 that I took the plunge, and went in for my first ½-plate set. This was a Sanderson Tripod Camera, having a Thornton Pickard roller blind shutter fitting on the front of the lens, and having a marked tendency to jump off under the stress of the discharge, chiefly because I had screwed up the controlling spring in order to obtain maximum speed. The change over to half-plate opened my eyes to the fact that, owing to the larger size, a far greater shutter speed was necessary, because a small amount of movement in the image appeared to be intensified out of all proportion. For this reason it was only a short time before I realised the necessity of a further outlay, and purchased a second-hand focal plane shutter, only to find that in order to take advantage of the speed which such a shutter gives, a faster lens was a vital need. (Continued on page 214)



L.N.W.R.: Manchester train hauled by "Dreadnought" class 3-cylinder compound "Vesuvius."



The "Constellation" photographed just after taking off. The 3-wheel undercarriage is retractable. Illustration by courtesy of Lockheed Aircraft Corporation, U.S.A.

Lockheed "Constellation" Transport

A FEW years ago Transcontinental and Western Air, Inc., one of the companies operating coast-to-coast and other long-distance air services in the United States, requested the Lockheed Aircraft Corporation to produce for them an air liner of more advanced design than any then in service, and capable of flying a big load of passengers non-stop across the American continent in luxury and in record time. The result was the 4-engined air liner to which has been given the type name "Constellation." The first of these machines made its initial flight on 9th January this year.

The "Constellations" are being handed over to the Government for war duty, and instead of going immediately into service as long-range air liners they will begin their careers as troop and cargo carriers for the U.S. Army Air Forces.

The "Constellation" is designed to carry 55 passengers and a crew of nine non-stop from Los Angeles to New York, covering the 3,000 miles in 9 hrs., and to fly from the Pacific Coast to Honolulu in 12 hrs. On these and other long-distance air journeys it will fly at heights of 20,000 ft. or more, so as to be above most of the rough-air weather disturbances. Comfortable travel at heights up to 25,000 ft. is ensured by special supercharging apparatus that keeps the air pressure in the cabin equal to that at only 8,000 ft., and can maintain comfortable breathing pressure even as high as 35,000 ft. Most of the seats for the passengers can be converted into berths at night, for 22 passengers.

This new Lockheed aircraft has four 2,000 h.p. Wright "Cyclone" 18 engines. Definite performance details are not available, but the Lockheed firm state that it has "a top speed comparable with the cruising speed of fighter planes," and a cruising speed at about half engine power that is roughly 100 m.p.h. faster than present standard transport aircraft.

In design the "Constellation" owes much to the famous Lockheed P-38 "Lightning" fighter, as the wing was developed from tests on a "Lightning" wing, and is, in effect, an enlargement of it, embodying the same high lift, low drag, and first-rate flight characteristics. The wing form adopted permits the use of Lockheed Fowler flaps, which when lowered reduce the speed to 77 m.p.h. for safe landing, and the incorporation of so-called manœuvring flaps which when extended increase the lift so that the machine can climb rapidly from a short airfield, or manœuvre at low speed during icing conditions or bad weather. The special flaps telescope into the wings.

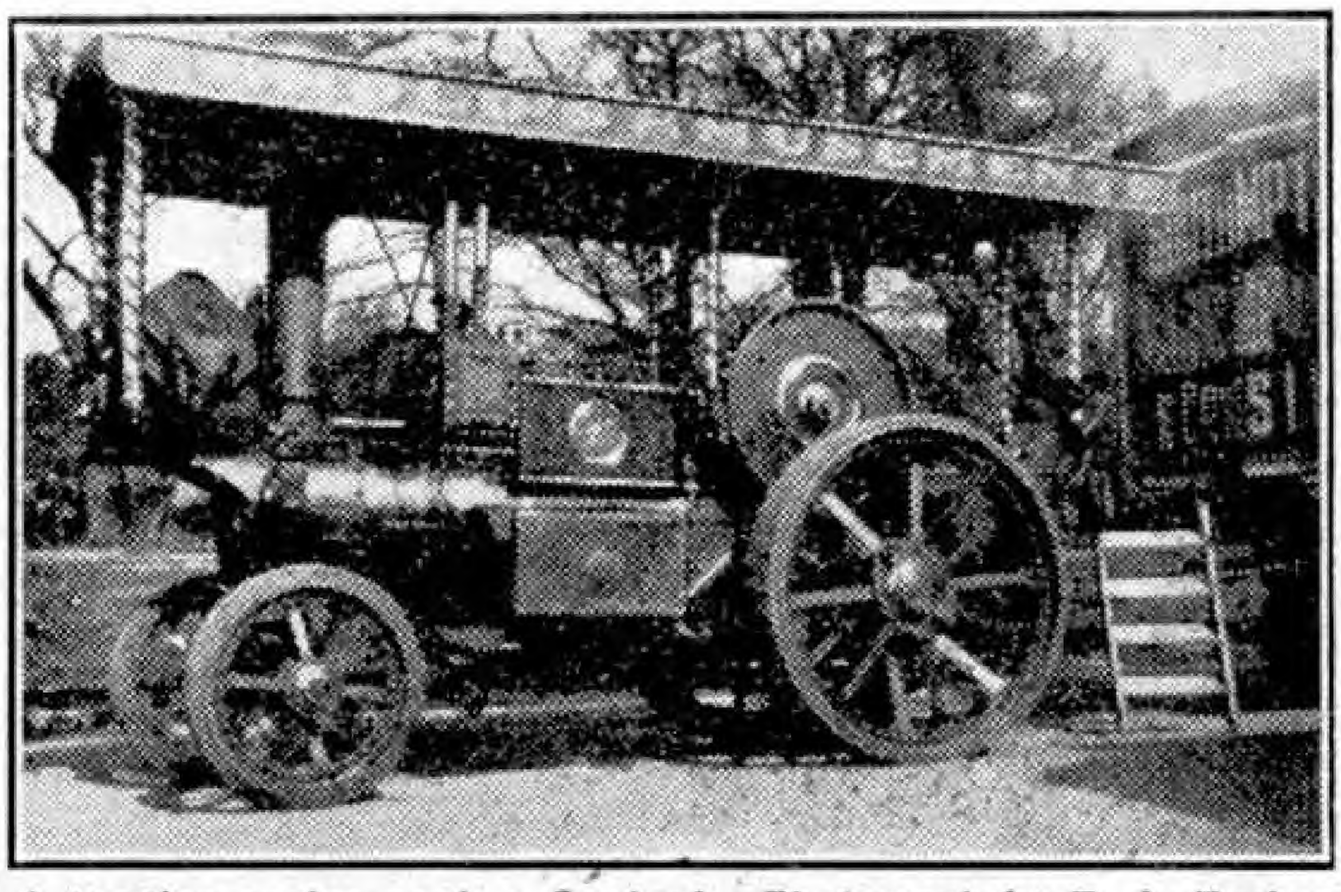
The fuselage is the best of 11 shapes which were developed and tested, and is circular in cross-section, this form being considered advisable for a pressurised cabin. It is uncommon in having a slight fore-and-aft camber, or curve, which makes the forward end slightly resemble an aerofoil section. This camber was adopted to obtain the utmost floor width, especially in the nose and tail, for the comfortable accommodation of the largest number of passengers.

Have You Ever Thought About This?

II.—Why Do Most Engines Have Flywheels?

WE run an engine to make life easier for us by working on our behalf. At first glance it seems silly to burden it with a large and heavy wheel that it has to turn at high speed, for this suggests waste of coal or petrol. What is the idea behind this?

The answer is that putting on a heavy flywheel is the easiest way of making sure that an engine runs evenly. Once the flywheel has been started it keeps on spinning for quite a time, and because of this it carries the moving parts of the engine with it in the intervals between the applications of the power in the cylinder. Thus the coal or petrol used to turn the flywheel is not wasted; the power expended in speeding up the flywheel comes back to the engine itself just when it is wanted to keep all moving parts running as steadily as possible.



A traction engine needs a flywheel. Photograph by E. A. Tucker.

Let us see how this works in a single cylinder steam engine. The power of this is most effectively applied when the piston and connecting rods are perpendicular to the crank. Twice in every turn of the crank the piston and connecting rod are in line with the crank, however, and at these points, known to engineers as the top and bottom dead centres, the movement of the piston is not turning the crank. Without a flywheel the engine would be erratic, slowing down as the crank approached the dead centres. With a flywheel the impetus provided by the heavy mass turning at speed carries the crank easily over the dead centres.

Another very good example is the single cylinder petrol or gas engine. Only one in four strokes of the piston of such an engine is a power stroke, and during the remaining three strokes—that is during the exhaust, suction and compression strokes—the piston must move up or down the cylinder without the direct help of energy from the explosion of the charge. The flywheel keeps on moving, however, and the energy stored up in it during the firing stroke carries the piston through the three "idle" strokes, as they are called.

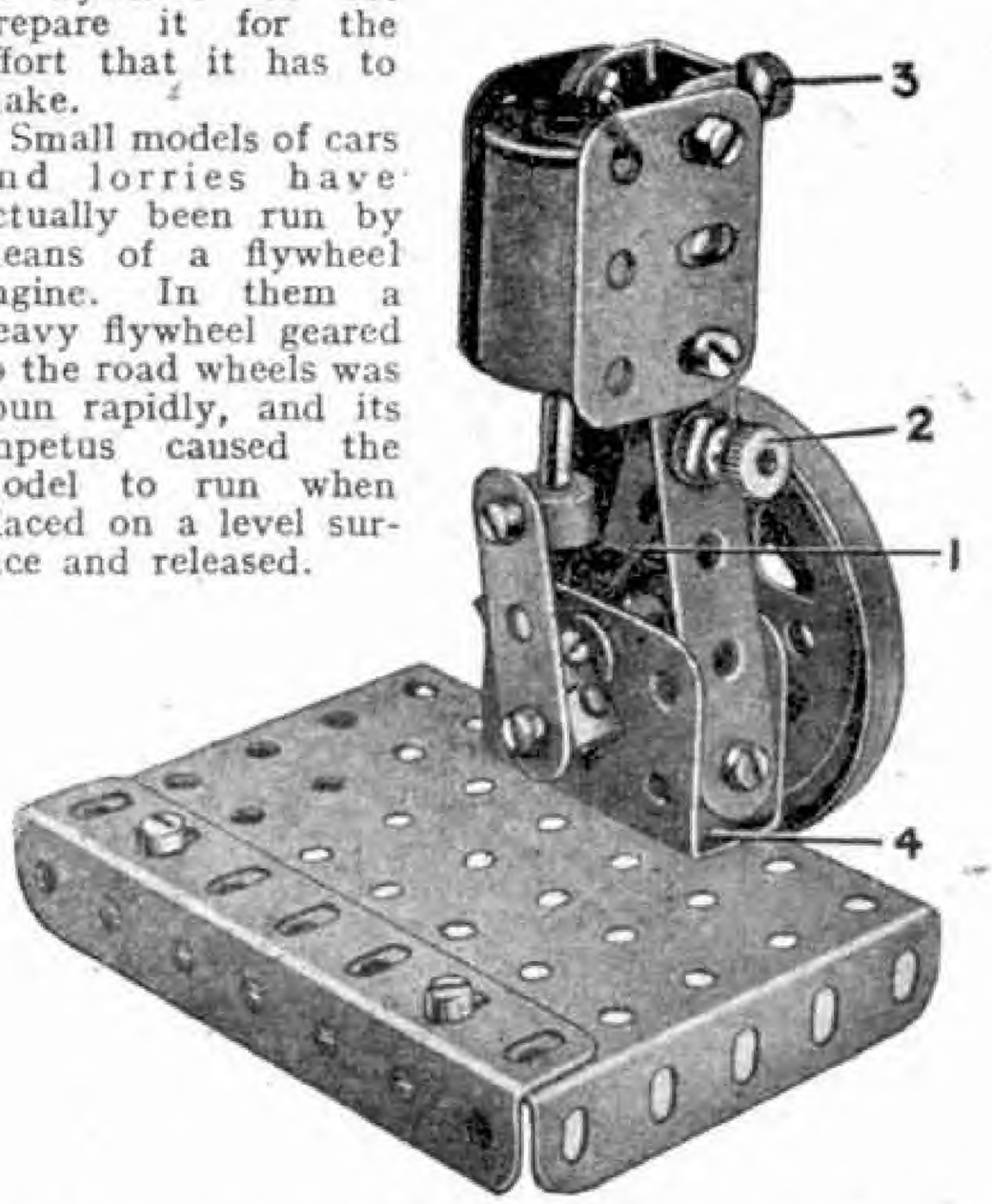
There really is a lot of energy in a spinning flywheel. Sometimes indeed it has been too much for the wheel itself. When an engine has accidentally been "raced," or run too fast, or where there has happened to be a crack or a flaw in the flywheel, the latter has actually "exploded," shooting lumps of itself through walls and roofs.

You may ask why a railway locomotive has no flywheel if flywheels are such good things. It is true that the steam locomotive is not given an actual flywheel, but it has something "just as good." As soon as the steam is admitted to its cylinders, the driving wheels begin to turn and the whole mass moves forward. The impetus acquired in this manner is very real, as you would find if you tried to stop a locomotive immediately after steam is shut off; and it helps to keep the wheels turning steadily. In fact the locomotive itself is its own flywheel!

In contrast a road engine has a flywheel. Now the power of a traction engine is small in proportion to the mass moved, and the movement itself is slow. This means that the impetus acquired when the engine is working is very small, for it depends on speed as well as on weight. An ounce of lead dropped on a table creates only a rattle, but when shot out of a rifle at high speed is enough to kill a charging elephant! The rate of movement of a road engine is too slow to be effective, and a flywheel therefore is necessary.

Flywheels can be used to store up power for doing work in such machines as presses. In these the punching tool moves up and down, but is only doing really heavy work for a very short period in its movement. While it is simply moving up and down, the flywheel of the press is being made to spin more quickly, and so to acquire greater impetus or momentum; and the reservoir of energy thus accumulated is drawn upon as soon as the press tool actually meets the work. A press would not work as smoothly and as efficiently if its flywheel did not prepare it for the effort that it has to make.

Small models of cars and lorries have actually been run by means of a flywheel engine. In them a heavy flywheel geared to the road wheels was spun rapidly, and its impetus caused the model to run when placed on a level surface and released.



This Meccano electric engine, which is equivalent to a single cylinder steam or petrol engine, has a flywheel to even out its movement.

Air News

An Aeroplane of the Future

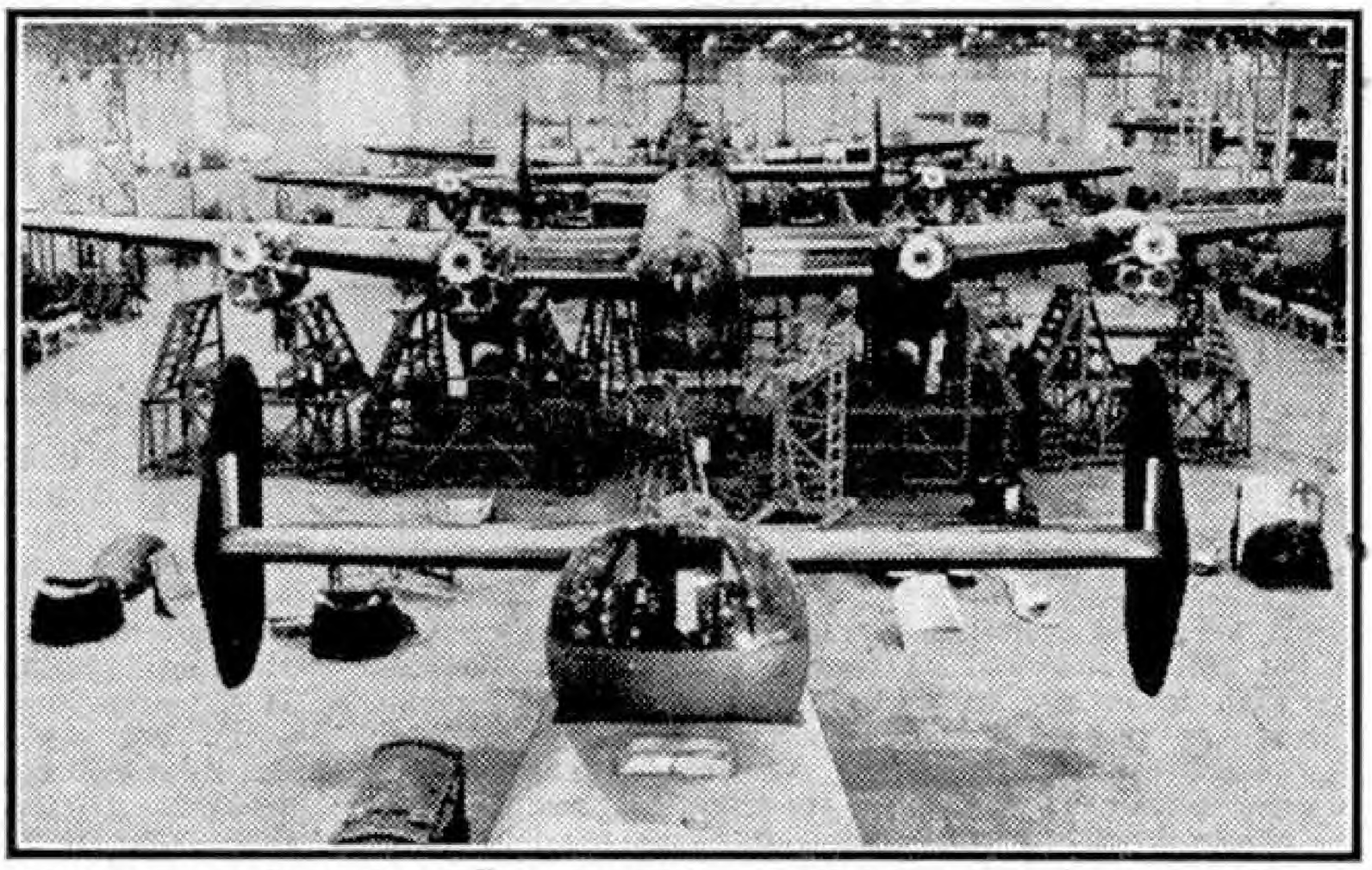
Mr. J. H. Kaiser, the well-known American shipbuilder who last year extended his activities to aircraft production, has stated that he is planning to produce a large all-metal transport aircraft of the "pterodactyl" type. He estimates that with four 2,000 h.p. engines mounted in a wing of 282 ft. span, his proposed tailless machine would have a loaded weight of 87½ tons, and be able to carry 45 tons of bombs or cargo.

R.A.F. Transport Command

A Royal Air Force Transport Command has been formed, with Air Chief Marshal Sir Frederick Bowhill as Air Officer Commanding-in-Chief. It controls the operations of R.A.F. transport squadrons at home, and is responsible for the organisation and control of strategic air routes, for overseas ferrying, and for reinforcement moves of squadrons to and between overseas theatres. The R.A.F. Ferry Command, of which Air Chief Marshal Sir Frederick Bowhill had been head since it was formed in June 1941 to take over Atlantic ferrying operations, has become a subordinate formation.

Transporting Crude Rubber by Air

More than 100 tons of crude rubber have been collected and flown from aerodromes in Central America by northbound U.S. Army Air Forces machines since December 1942, and the traffic is still increasing. Most of this crude rubber has been obtained from the Republic of Panama. It is bagged in 100 lb. lots, and a machine can transport up to 4,000 lb. at a time. Quantities of crude rubber from South America also have been conveyed to the United States by air.



Birth of a bomber. The last stage: a line of "Halifaxes" nearing completion.

At a Modern Aircraft Factory

The striking photograph on this page and the upper one on the next page give a vivid idea of the great size of modern aircraft factories, such as described by Mr. C. G. Grey, in his interesting article on this subject in last month's "*M.M.*" The illustrations to that article were actually taken in 1939, by Mr. C. A. Sims, then staff photographer of "*The Aeroplane*," and now Flying Officer, R.A.F., and they show that even then we were not so far behind, although the number of factories was very much smaller.

East Flights on North Atlantic Return Ferry

A new record for a West to East flight across the Atlantic has been set up by Capt. W. S. May, a British Overseas Airways pilot. He made the 2,000 miles flight from land to land in 6 hrs. 20 min., and his time from taking off to landing was 7 hrs. 40 min., which is 21 min. less than the previous record of 8 hrs. 1 min., achieved by a R.A.A.F. officer, flying a Lockheed "Hudson." Capt. May was flying a Consolidated "Liberator" on the North Atlantic Return Ferry service, and was helped by a strong tail wind.

Some further details of the Return Ferry can now be added to our notes on this subject in last month's "*Air News.*" The service has been operated by British Overseas Airways since September 1941, to the requirements of R.A.F. Ferry Command, and 400 crossings of the North Atlantic have been accomplished in just over 18 months. One of the pilots engaged in this work, Capt. L. V. Messenger, O.B.E., has flown the Atlantic over 50 times, and two others, Captains G. R. Buxton and S. T. B. Cripps, have done 44 and 39 crossings respectively. These two pilots have also carried out several delivery flights from Canada, and on one recent crossing Capt. Cripps flew from Montreal to Great Britain, 3,100 miles, in 12 hrs. 30 min. In the other direction Capt. Buxton not long ago flew to Montreal in 14 hrs. 52 min., which almost equalled the record of 13 hrs. 30 min. for an East to West Atlantic flight set up in June 1941 by the late Capt. E. R. B. White on a flight from England to St. Hubert, Quebec.

When in November 1940 the first flights from Newfoundland were made under the leadership of three British Overseas Airways Captains—D. C. T. Bennett, now an Air Commodore, R.A.F., Humphrey Page, and Gordon Store—the Atlantic had never been flown in winter, and many experts declared that continuous operation during the winter season would be impossible. Before long, however, B.O.A. pilots were undertaking the far more difficult task of regular westbound flights from Britain to Canada. In this direction the prevailing winds are against the aircraft, especially in winter, when often the machines have to battle against winds of from 50 to 60 m.p.h. for most of the crossing.

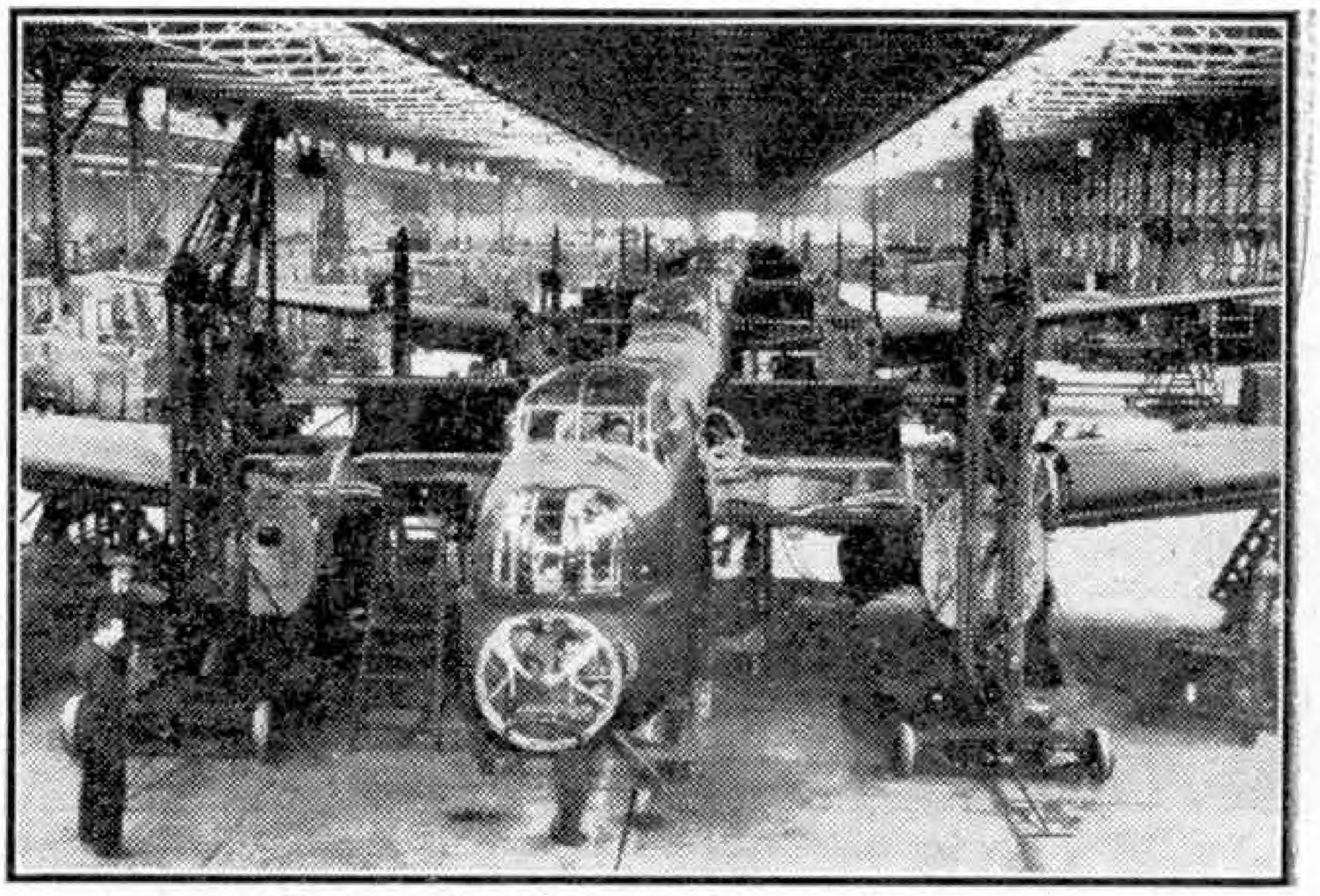
In both directions dangerous icing conditions are encountered, and to avoid ice-forming clouds the machines have to fly at heights up to 20,000 ft., in temperatures which often range as low as 50 deg. below freezing point. Special means have had to be devised to combat ice formation on the "Liberator" aircraft used on the service, and to prevent the freezing-up of engines.

* * * *

New aircraft for Russia are being ferried across the United States and Canada to Nome, in Alaska, where Russian pilots, some of whom are women, take over the machines and fly them the rest of the way to their destination. This information was given recently by Air Chief Marshal Sir Arthur Longmore on his return from a tour of inspection of R.A.F. and Commonwealth Air Training Plan schools in Canada.

The Norden Bombsight

Brief information about the Norden bombsight, so long officially a secret, has been issued by the U.S. War Department. Its construction is said to include three metal spheres, in one of which there is a telescope with cross-hairs which have to be sighted on the target, after which the bombsight automatically keeps on that target, no matter how fast the machine is flying or what movements it may make. One of the two other spheres contains a gyroscope, but the content and purpose of the third sphere is still a secret.



"Lancaster" bombers on the assembly lines.

Helicopter Developments

Capt. H. H. Balfour, Under-Secretary for Air, stated recently that helicopters are to be used by the Royal Navy, and it is reported from the United States that Vought-Sikorsky helicopters are to be used by the U.S. Navy for anti-submarine work. The Royal Canadian Air Force have ordered six American helicopters, and it is thought that these may be for rescue work in connection with military aircraft forced down in difficult territory.

North-East Airlines, Inc., an important American air transport company, have applied to the U.S. Civil Aeronautics Board for authority to operate after the war a helicopter air mail service from the roofs of about 400 post offices to main airports in that country. In a recent speech the President of the company visualised an extensive use of helicopters after the war for the transport of both passengers and freight to and from aerodromes on the main air routes.

Douglas "Skytrain" as Air Ambulance

The Douglas C-47 "Skytrain," military version of the DC-3 air liner, has appeared adapted for use as an air ambulance. In this form it is provided with 18 stretchers arranged in three tiers of six and resting on brackets fixed to the sides of the fuselage. When used as an air ambulance the machine is unarmed. It can be converted for this duty in 18 min. by a trained crew, and can be loaded or unloaded in 15 min.

The "Skytrain" is in service as a troop carrier, with bench seating for 28 fully armed men, and as a freight carrier, with the U.S. Army Air Forces.

* * * *

Operation of the British Commonwealth Air Training Plan in Australia and New Zealand has been extended to 31st March 1945 by agreements signed in London. Extension of the Plan in Canada to the same date was obtained by agreements signed in Ottawa in June last year.

* * * *

The 210 ft. high airship mooring mast at Cardington R.A.F. station is to be taken down, and its 250 tons of high grade steel used for war purposes. It is not practicable to "fell" this latticed steel mast, and the consequent slow job of dismantling it will take 10 workmen about three months. The mast was erected in 1926 and cost about £150,000.

* * * *

The Air Training Corps will be continued after the war.

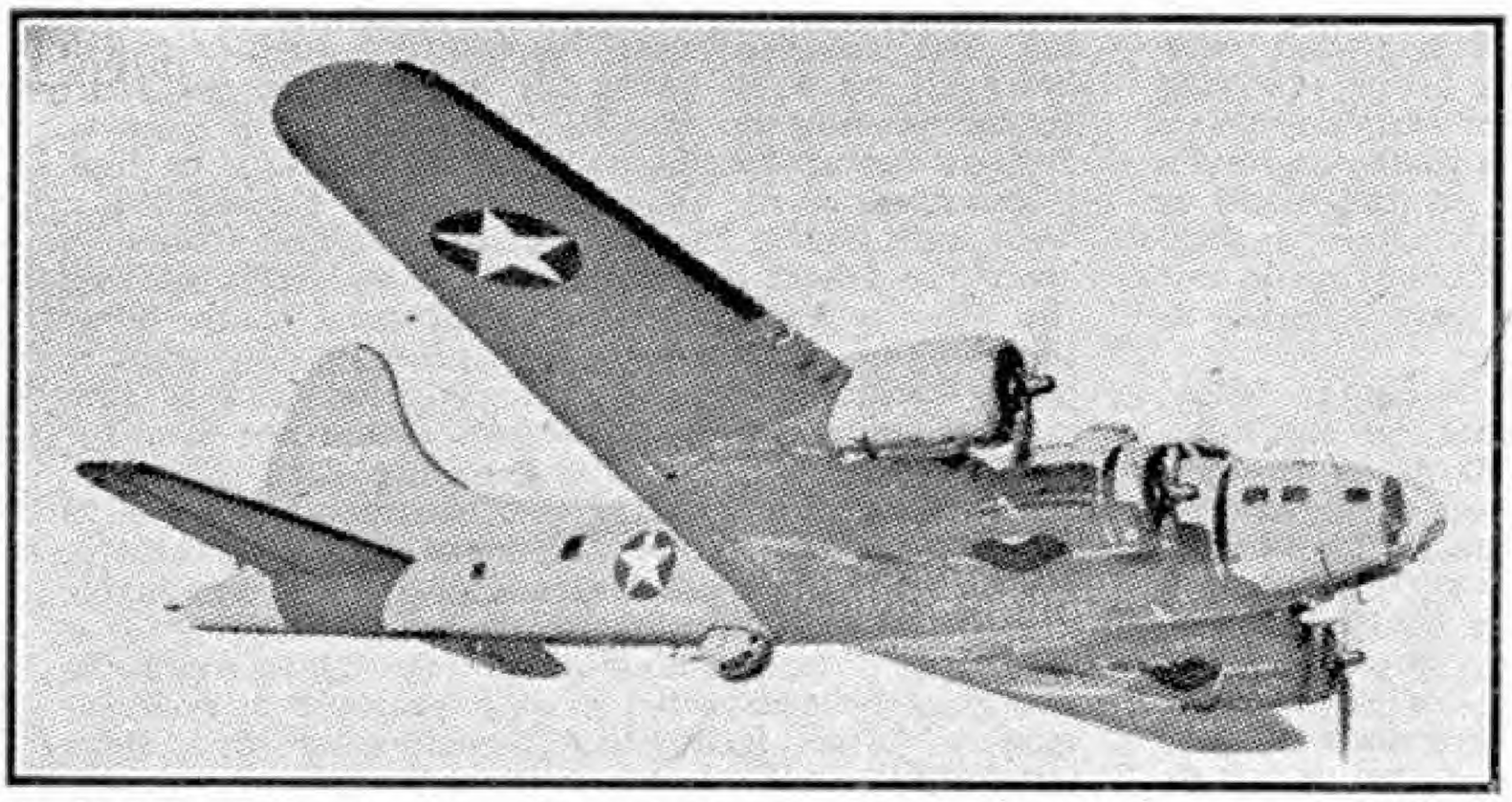
* * * *

The Bell Aviation Corporation, U.S.A., have patented a design for a single-seat fighter with pusher airscrew, and a tail carried by twin booms.

* * * *

Rubber seed has been dropped by parachute at remote plantations in the Belgian Congo, where rubber production is being increased.

* * * *

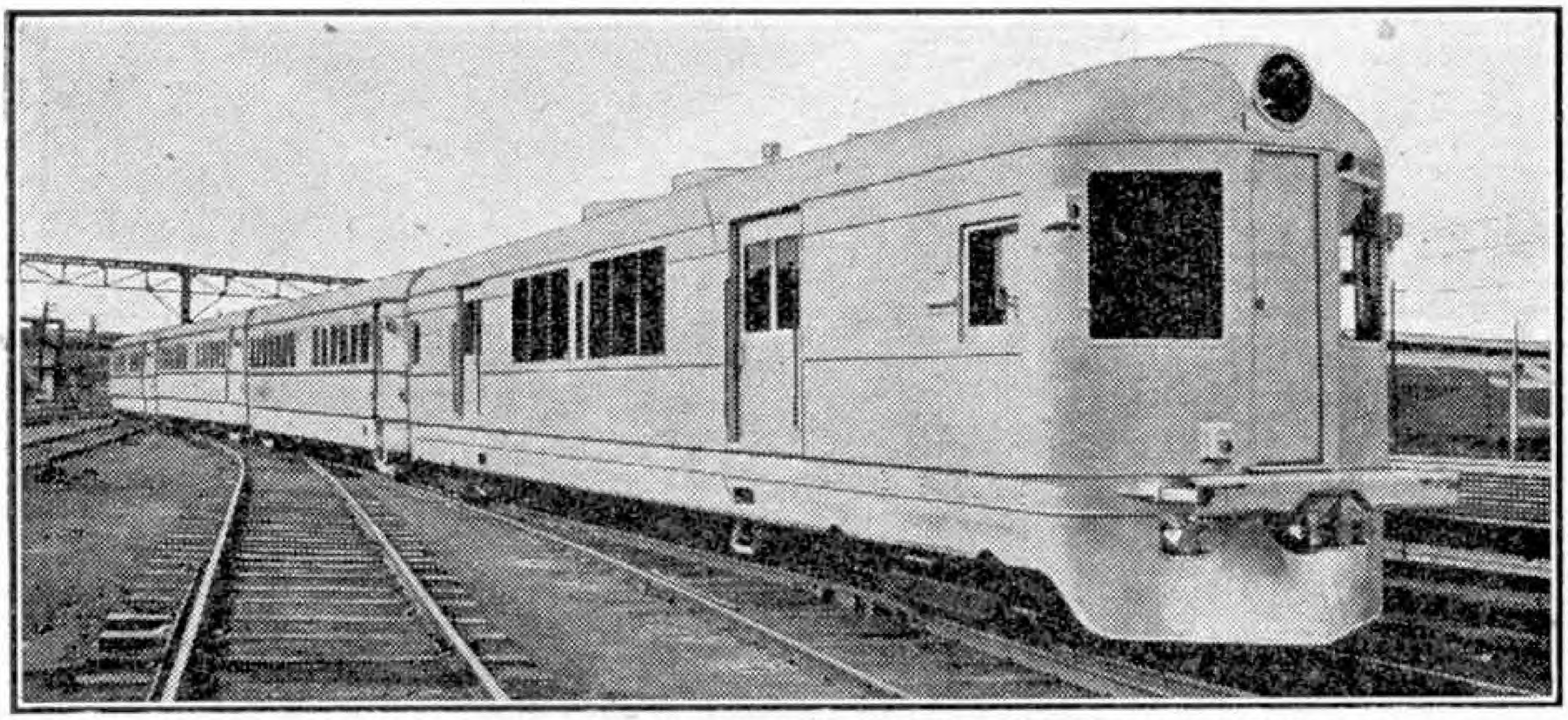


A fine flying view of a Boeing B-17F "Flying Fortress" heavy bomber. Photograph by courtesy of the Editor of the "Boeing News."

The Air Council have awarded Mr. Winston Churchill, the Prime Minister, the Honorary Wings of the Royal Air Force in recognition of his long association with military aviation. This is the first time that the flying badge of this Service has been granted to anyone outside the Royal family who has not qualified for it as laid down in Service regulations.

* * * *

A fighter squadron consisting entirely of Fighting French pilots using Russian machines has completed training and is ready for service with the Soviet Air Force. It has been named the "Normandie Squadron."



The "Silver City Comet," a famous Diesel-engined New South Wales Government Railways express.

The Diesel Engine Locomotive

I.—A Rival to Steam Power

By D. Rebbeck, M.A., (Cantab), A.M.I. Mech. E.

MOST boys are familiar with the working of a petrol engine and fully understand the functions of the sparking plug, carburetter, etc., and in view of the very wide application of the petrol engine in our daily lives this is not surprising. The motor car and motor bike, the aeroplane, the buses and various commercial vehicles which surround us at work and play have brought the petrol engine and its component parts into the every-day vocabulary of the 20th century youth. Because of this, and because of the similarity of the Diesel engine, or compression ignition engine or heavy oil engine as it is also known, to the petrol engine, it is a surprising and remarkable fact, to the author at least, that few boys really understand the working of the Diesel engine. For this reason they fail to realise the important part, increasing daily, which this latest type of internal combustion engine is playing in our lives.

One of the purposes of these articles is to make the young engineer understand how the Diesel engine works and how it has been successfully applied to rail traction. In other spheres it has had wide application, such as in propelling ships, driving pumping sets, generator sets in power stations, heavy lorries and buses on our great trunk roads, and even aircraft. The largest Diesel engine in the world is running in a power station and develops a total brake, or effective, horse power of 22,500, so do not let us think that Diesel engines can only be made in moderate sizes like petrol engines.

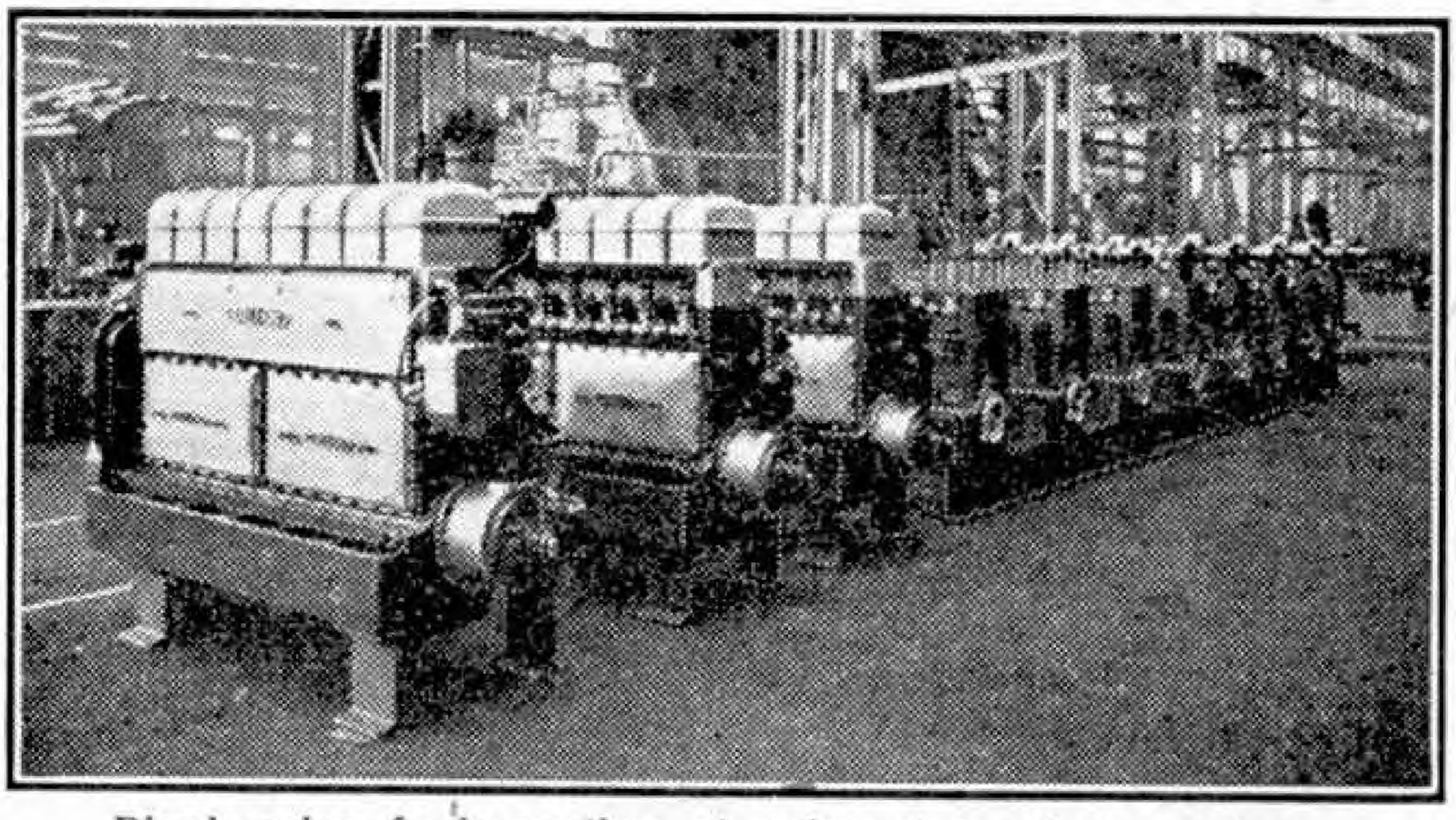
Briefly, the greatest difference between the Diesel engine and the petrol engine is that on the compression stroke the former has a charge of air only in the cylinder, whereas the latter compresses a mixture of air and petrol vapour. The working stroke of the Diesel engine is obtained by injecting a fine spray of oil vapour into the highly compressed air in the cylinder; the result is burning, expansion and a consequent downward movement of the piston. The petrol engine, of course, has its petrol-air mixture *exploded* by a spark from a sparking plug. Both engines have a compression stroke, a working stroke, an exhaust stroke and a suction stroke when working on the four stroke cycle principle, so called because there are these four strokes to each complete cycle.

In general, as far as railway work goes, however, the competitor of the Diesel-engined locomotive is the old and well-established steam engine. The steam locomotive has many advantages in this country, and is determined to put up a stiff fight when faced with the Diesel engine or the electric train. There is no doubt that for many years to come the steam locomotive will still occupy a premier position on our British railways. However, in such phases of rail traction as shunting, branch line and suburban work, the new rival, the Diesel engine, has much to recommend it, and has come to stay.

British engineers are very conservative in their outlook as far as railway locomotive design is concerned, and only in very recent years have we seen the advent of the streamlined steam locomotive in this country. Because of this conservatism many Diesel engine locomotive manufacturers made their products look as much like an orthodox steam railway locomotive as possible. As they produced mostly types of shunting and short-distance locomotives they did not however, have to go as far as retaining the large tender familiar on our long-distance steam engines! But as far as following the general design of tank locomotives went, they reproduced a faithful copy. Very ingeniously, they retained the chimney to carry away the Diesel engine exhaust gases; they retained the stumpy built-on tender and used it to house their storage batteries; and, in general, they tried to retain most of the everyday characteristics so that railway engineers and operatives would not take too unkindly to the new arrival. Since then, however, things have improved in this direction, and one of our illustrations shows a modern Diesel locomotive engine which does not try to look like a steam engine at all. It is hauling the New South Wales "*Silver City Comet*," seen pulling out of a station in Australia, and may be considered a good example of how the modern Diesel locomotive is embodied in a clean streamlined unit.

The greatest advantage which the steam locomotive has over its Diesel rival is the fact that it will run under the most trying conditions, even when it is

operating at a very low efficiency. It may be said in favour of the steam engine that, even when packing is leaking, when there is play in working parts and so on, as a unit it will still operate. Unfortunately in this respect the Diesel engine is a precision engine. It is manufactured to fine limits of very high quality materials, and to give the best results must be kept in perfect running order. This can readily be understood



Diesel engines for locomotives, at various stages of construction.

when it is realised that high pressures are worked to in the cylinders in order to raise the air to a sufficient temperature to ignite the fuel oil charge; and also because the fuel oil supply system must be very carefully made and maintained to ensure delivering the correct and very small amount of oil at very high pressure in order to penetrate the already highly compressed air in the cylinder.

The following qualities are essential for a Diesel locomotive engine:

(a) Working reliability.
(b) Long service without examination.
(c) Low fuel oil and lubricating oil consumption.
(d) High number of revolutions per minute and corresponding high power.
(e) Small weight and space for Diesel engine, etc.

The economic possibilities of heavy oil engines for locomotive power are commanding attention, not only because of the cheapness of fuel used, but also in respect of many other inherent advantages such as simplicity of operation, reliability and cleanliness. By the adoption of up-to-date Diesel-driven locomotives and the substitution of certain classes of steam-driven trains by light high-speed Diesel railcars, very substantial reductions in fuel and running costs, hithert unattainable on these important items of expenditure, are effected.

Many of the principal railways have proceeded far in the direction of Diesel traction, and the highly successful performances of the various types of Diesel locomotives and railcars so far constructed provide an index to their future prominence on the railways of the world.

Diesel locomotives and railcars where substituted for steam locomotives save approximately half the fuel bill under British conditions of fuel costs, while in oil-producing countries, the saving is even greater. Present-day high-speed Diesel engines have a consumption of well under half a pound of fuel per B.H.P. hour.

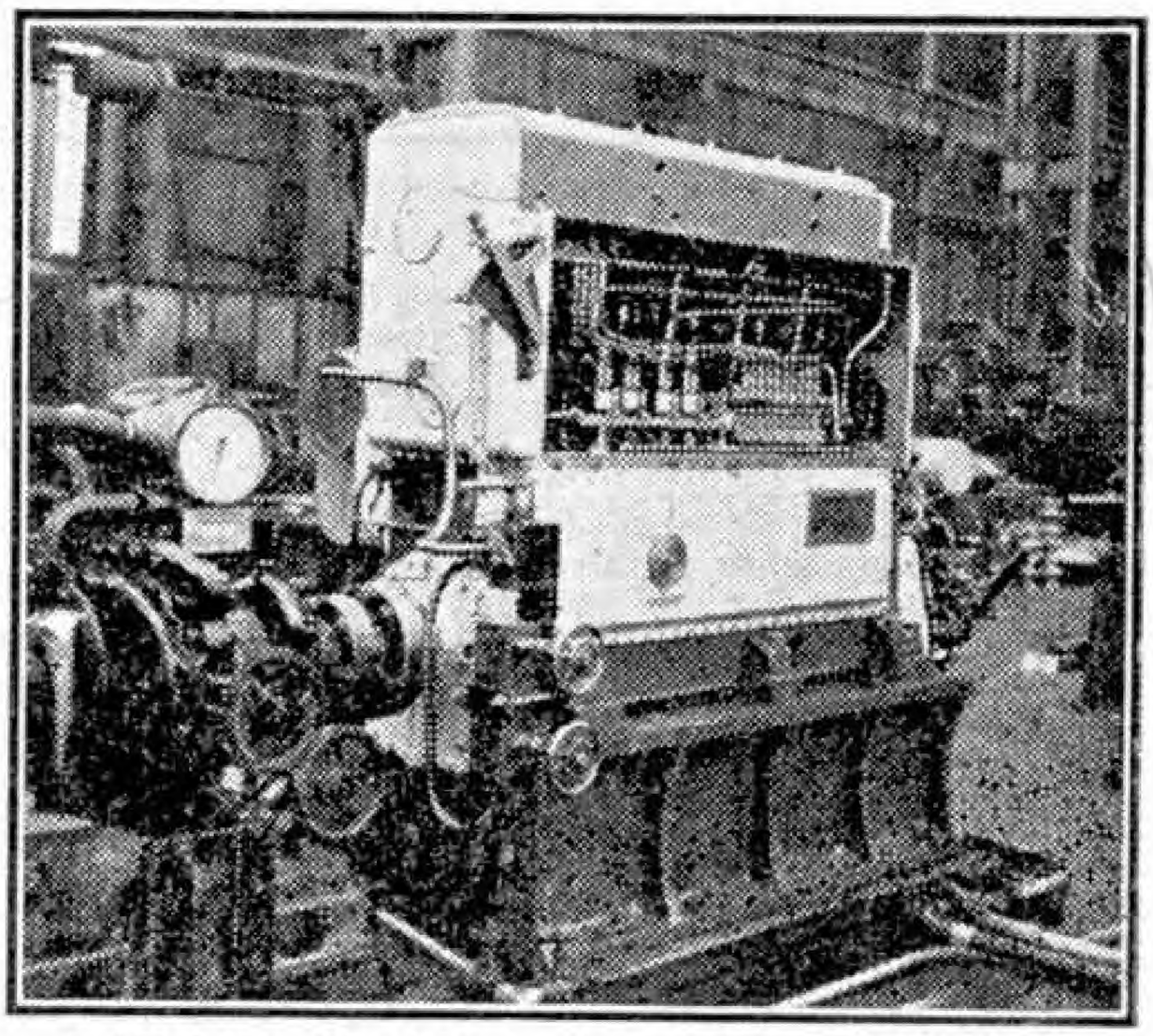
Diesel locomotives embodying suitable drives have special advantage for shunting purposes owing to their high tractive efforts at low speeds; in addition, the absence of overhead wires and live rails enables them to operate in circumstances which would militate against the use of the all-electric drive.

A Diesel-electric locomotive can be placed at any part of the train and driven from either end by one driver in almost exactly the same way as an ordinary electric train. The controller is provided with means whereby the Diesel engine can be started and stopped immediately without the necessity for an attendant in the engine compartment. The Diesel unit is stopped at stations when the stopping period is long enough to be worth while, and it can be automatically run at its idling speed by moving the controller back to the first notch, as on down gradients. The driver need not enter the engine compartment, and when two locomotives are required for heavy trains both can be operated by one driver.

The wages bill for a Diesel locomotive, even if a stand-by driver is carried, works out at substantially less than for steam locomotive operation, on account of the reduction in the time required for preparation at the beginning, and laying-off at the end, of the day's running; also the loss of time incurred in taking water and cleaning of fires is eliminated. As a Diesel locomotive can be operated from either end, the use of a turntable is unnecessary, which means that less time is lost at terminal stations.

The savings that can be effected by Diesel locomotives are frequently much higher than can be obtained by complete electrification, on account of the high capital cost of the latter, this being particularly evident in the case of branch lines and suburban traffic in the smaller towns.

The immediate availability of the Diesel locomotive and the fact that there is no wastage while standing idle or when hauling light loads are outstanding points in the case for its adoption. An interesting example of the economy of Diesel engines was brought out in the case of a 270 b.h.p. Diesel locomotive which took over the work previously carried out by a steam locomotive on a branch line in Great Britain. A direct saving in running expenses of £730 was effected in the first year's (*Continued on page 214*)



A 170 b.h.p. Diesel locomotive engine on the test bed.

Of General Interest

Proposed Dam for Ocean Current

Less than a tenth of the water falling on South Africa in the form of rain runs back to the sea. Most of this flows towards the east coast, and on the western side of the country, including South West Africa, there is a huge region of desert in which the rainfall is very small, that on the coast being negligible. The reason for this dryness is to be found in the paths of the ocean currents along the western coast. There is a warm current flowing southward from tropical regions, but this scarcely reaches South Africa, for it is met by a cold current flowing northward from Antarctic regions, and both currents turn westward at the point of contact. The result is that the north-west moisture-laden winds lose their water over the cold ocean before reaching land.

In 1934 the northward course of the cold current was checked, probably by volcanic disturbances at sea, with the result that the warm current from the north flowed considerably farther to the south. The result was almost miraculous; country that had been parched and arid for years became rich grassland, while torrents of water poured down what had been dried up river beds.

It is clear that if in some manner the cold current could again be checked the desert lands of South West Africa would once more become productive. Unfortunately it is not as easy to dam an ocean current as it is to control a river. Nevertheless a scheme for dealing with the cold northward current has been suggested. It has been noticed that silt brought down in enormous quantities by the Orange River has built up a large promontory under the sea. The proposal is to suspend screens from floats in order to intercept the silt and form a great bank to check the flow of the northward current. The bank could be reinforced by stones and other materials carried out from land. Such a scheme of course would be expensive and a considerable time would be required to build up a bank of the required dimensions, but it is believed that the expenditure would be worth while if the extensive desert lands were made productive and valuable.

Jumbo takes them for a ride. Photograph by L. C. Morgan, London S.W.2.

Iron Ore Discovery in Canada

One of the richest treasures of iron ore of the highest quality has been discovered under a small rock-bound lake in Canada about 132 miles north-west of Lake Superior. Nearly half a century ago a geologist who noticed boulders of a hard iron ore on the shores of the lake came to the conclusion that they had been gouged out of a great mass of ore by the glaciers of the Great Ice Age, but nothing was done to discover this supposed mass until a few years ago. Then a Canadian mining veteran undertook to drill holes to explore the ground for it. Drills faced with diamonds were employed in this search, and when four deep holes failed to reveal the presence of the ore the search was almost abandoned. Fortunately it was decided to try again, and at the sixth attempt the ore was struck.

From further drillings it is now believed that there are millions of tons of high quality ore under the lake. This is extremely hard, so hard indeed that it wears down the diamonds of the drills at a very rapid rate. Mining on a huge scale is contemplated, and a suggestion has been made that an outlet should be blasted through the rocky walls of the lake in order to drain off the water, so making a huge open pit from which the ore could be quarried directly instead of being mined by sinking shafts and driving galleries underground.

Try This for Yourself

Here is a very neat trick that is easily carried out and has an interesting industrial application. Cut a square of thin cardboard, with a side of about 2 in., and put a pin through the centre. Place the sharp end of the pin inside a tube of some kind, of $\frac{1}{4}$ in. to $\frac{1}{2}$ in. diameter, that has a flange or flat surface against which the card can be pressed. If such a tube is not available, an ordinary cotton reel or bobbin will do. Hold the tube or reel upright, keeping the card close up to its lower end, blow strongly down the opening and let go of the card. You will expect this to be blown away; instead it is sucked strongly up to the tube and remains there as long as you blow. It is indeed impossible to blow the card away, a result that seems contrary to common sense.

The explanation is that because of the rush of air down the tube, the air between its end and the card is displaced so quickly that a partial vacuum is created, with the result that the pressure of the atmosphere under the card holds it in position. The effect is very much like that of a well designed aeroplane wing, over the upper surface of which there is a lowering of pressure, produced by the suction of the airflow, that helps to give necessary lift.

The trick solved an interesting manufacturing problem in an aluminium factory in the United States. Flat plates of aluminium up to $\frac{1}{4}$ in. in thickness stamped out in a press could not easily be removed from the lower die, to which they adhered, except by inserting a tool to prize them up, a practice that slowed down operations and carried with it a risk of harming the finish of the sheet. The solution of the problem came when holes $\frac{1}{4}$ in. in diameter were drilled in the upper die and compressed air at a pressure of 80 lb. per sq. in. was forced down them. The stampings adhered to the upper die and were lifted with it, to be released immediately the flow of compressed air was shut off.

Invasion Craft of 1,000 Years Ago

We have all read about the Vikings, and most of us can picture in our minds the long narrow vessels in which these fierce marauders crossed from their native Scandinavia to plunder the British Isles. They became worshippers of the sea, partly because of the large proportion of their time which they spent on the restless waves and partly because they were a very superstitious people. They almost considered their ships to be living things, and when a sea rover died he was often buried in a boat-shaped grave.

The bodies of the chiefs were usually burned on a funeral pyre that also consumed the beloved ships in which they made their daring voyages. Often however the chief was actually buried in his ship, which was drawn up the beach well away from the sea. The burial ceremony included the placing in the ship of all the Viking's possessions, including his livestock, so that he would not travel hungry on his long journey. After all was completed and respectfully put away in the ship, a large mound of earth was piled on top.

Several of these mounds have been excavated and from them we have learned much of the lives of these early rovers. When in Denmark before the war the writer paid a visit to one of the latest of these discoveries, which was excavated at Ladby in the north-east of the Danish island of Funen. This particular ship was excavated in 1935 and is believed to date from the year 950. It was in quite good condition in parts and the contents are clearly visible.

A Viking ship unearthed at Ladby, in Denmark.

Since the accompanying illustration was taken a concrete shelter has been built over and around the ship, and good lighting shows up the rather ghastly remains, housed in an enormous glass case. The bones of the horses and cattle are very clearly seen, and various drinking utensils, plates, etc. are also noticed. The wooden prow and the old rusty anchor are plainly visible, as also are old chains and various chattels from the great man's house.

The ship is supposed to have been about 75 ft.; the draught was very small, being generally about 3 to 4 ft. The timber employed in the construction of this vessel must have been hard and well seasoned to have lasted 1,000 years, and was hewn from the forests which covered northern Europe in those early days. Seaworthiness and speed were all important, but comfort does not appear to have been even considered in these early craft.

D. Rebbeck.

Fossil Magnetism

All readers of the "*M.M.*" will know that the magnetic compass does not point directly to the North Pole, but to the magnetic pole, but how many know that its needle is slowly but surely moving east or west? Records of its movement in the London district for nearly 400 years show that early in the 18th century it pointed exactly to the North Pole. Previously it had pointed east of north, that is in the direction of Norway, and for about 100 years afterwards it tended more and more to the west before again turning east. At present it points about 11 deg. west of north, and this declination is slowly decreasing.

Although measurements of the direction of the Earth's magnetic field, which controls the position of the needle of a compass, have been kept for only about four centuries, we now know that the needle has been wandering slowly backward and forward in this manner for thousands of years. Strangely enough the evidence comes from mud laid down at the bottom of lakes in the Great Ice Age. Many instances have been discovered where the layers of clay deposited in successive winters and summers can easily be traced. The thaws in summer washed particles of clay down into lakes on the edges of the glaciers that then stretched over the whole of Northern Europe and America. The larger particles settled down first on reaching the calm waters of the lake, and the finer particles were deposited as a thinner and darker layer during the following winter. In many places these layers can be traced as easily as the growth rings of a tree can be distinguished, and a calendar of the "varves," as they are called, has dated layers for a period of over 7,000 years.

The interesting feature of the varves is that the clays of which they consist are slightly magnetic because of the presence in them of tiny particles of magnetic compounds, almost certainly of iron. As they settled down these magnetic particles set themselves in the direction of the Earth's magnetism, just as iron filings do on a sheet of cardboard placed over a strong magnet. By cutting cubes of clay from these varves in definite geographical directions, it has therefore been possible to discover the direction of the Earth's magnetic field at the time they were formed.

Wolves of the Sea

The most deadly and dangerous of all fish in the sea is not the shark, but the barracuda, a real wolf of the ocean. It is at home where the water is only a few inches deep, among coral reefs, or in the deep sea, and it lurks motionless, its presence not betrayed by a projecting fin as that of the shark usually is, ready to rush with terrific speed at any living object coming within reach. Then a single snap of its jaws goes through flesh and even small bones, and it returns viciously to the attack at lightning speed. The barracuda is smaller than the shark, but can readily bite off a man's hand or a foot.

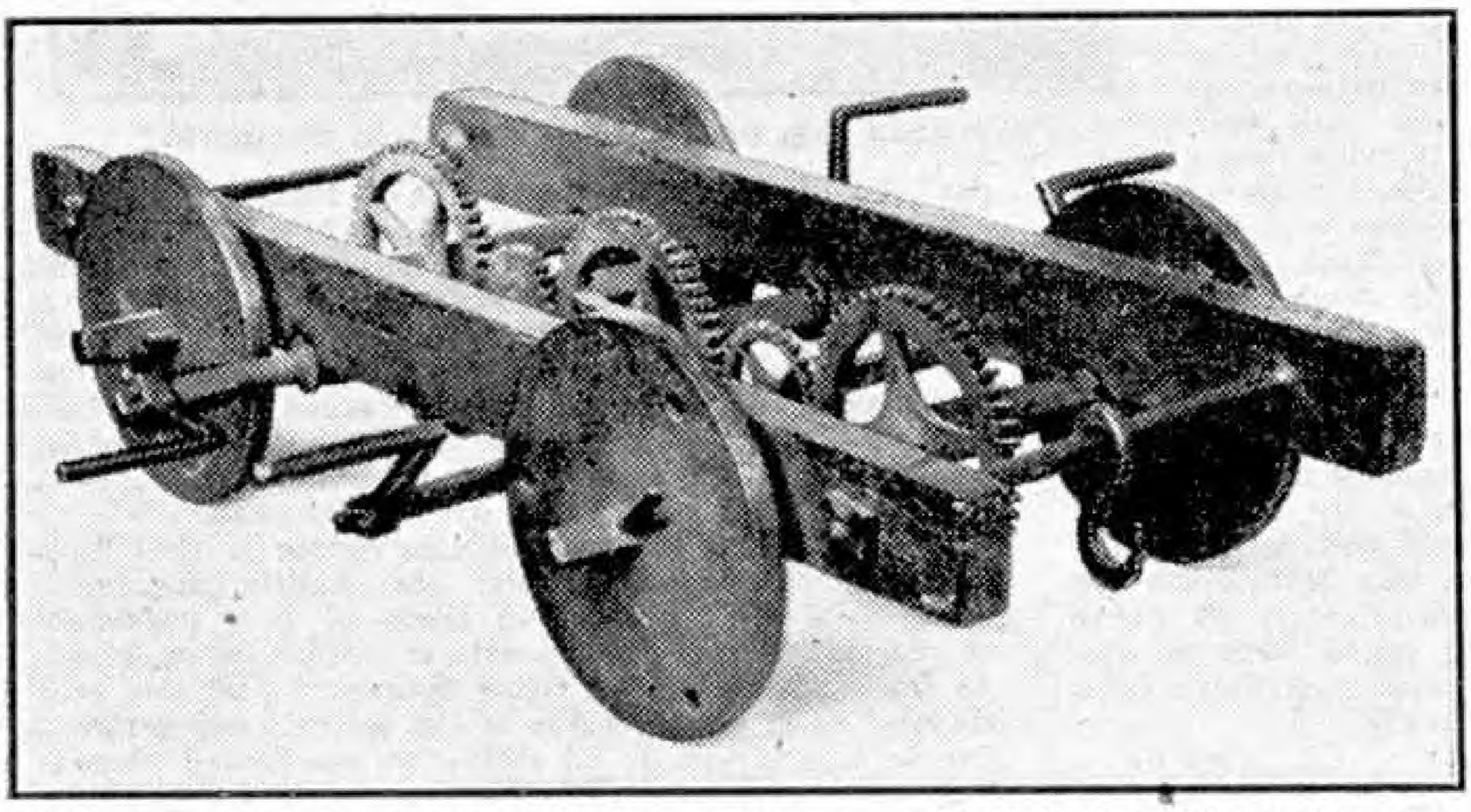
Another wolf of the sea is the big green moray, which is eel-like in shape and often grows to a length of 10 or 12 ft. It has so many sharp strong teeth that it is unable to close its jaws. It is slippery and strong, and its bite is capable of severing a man's arm. Fortunately it spends most of its time in holes and crevices in coral reefs or on the rock bottom of the sea, strictly minding its own business.

William Hedley

A Pioneer Locomotive Builder

WILLIAM HEDLEY was born at Newburn, near Newcastle-on-Tyne, on 13th July 1779. We do not know much of his early life except that he was educated at a school at Wylam and that he was good at mathematics. When he was 21 he secured an appointment as viewer, or superintendent, at Walbottle colliery in Northumberland, and subsequently became viewer at the Wylam colliery. It was while he was at Wylam that he became interested in the possibilities of the steam locomotive.

Christopher Blackett, the proprietor of the colliery, had for some years been in search of a cheaper means than horse haulage of carrying coal from the pit mouth to Lemington on the Tyne, where it was transferred to keels, or flat-bottomed lighters, for conveyance to the ships. M. Archer, in his book "*William Hedley. The Inventor of Railway Locomotives on the Present Principle*" tells us that the Wylam way was first of wood, each wagon being drawn by one horse. About 1808 it was relaid with cast iron rails on an easier route, and then each horse hauled two wagons. The strain on the animals was very severe, however, and spare horses had to be kept as reliefs. Later two oxen shod with iron were tried, but without success, as they were much slower than the horses.



Hedley's model for testing adhesion. From an exhibit in the Science Museum, South Kensington, London. Crown Copyright.

Blackett had noted with interest the trials of the locomotive built by Richard Trevithick that ran on the Pen-y-darran wagon way at Merthyr Tydvil in 1804. This locomotive drew five wagons containing 10 tons of coal and 70 persons for a distance of nine miles at a speed of nearly five miles per hour. Blackett ordered a locomotive to be built from Trevithick's designs by John Whinfield of Gateshead. This engine was completed in 1805 and ran successfully on a temporary way laid down in the works, but for some reason was never delivered and remained in the works for use as a stationary engine.

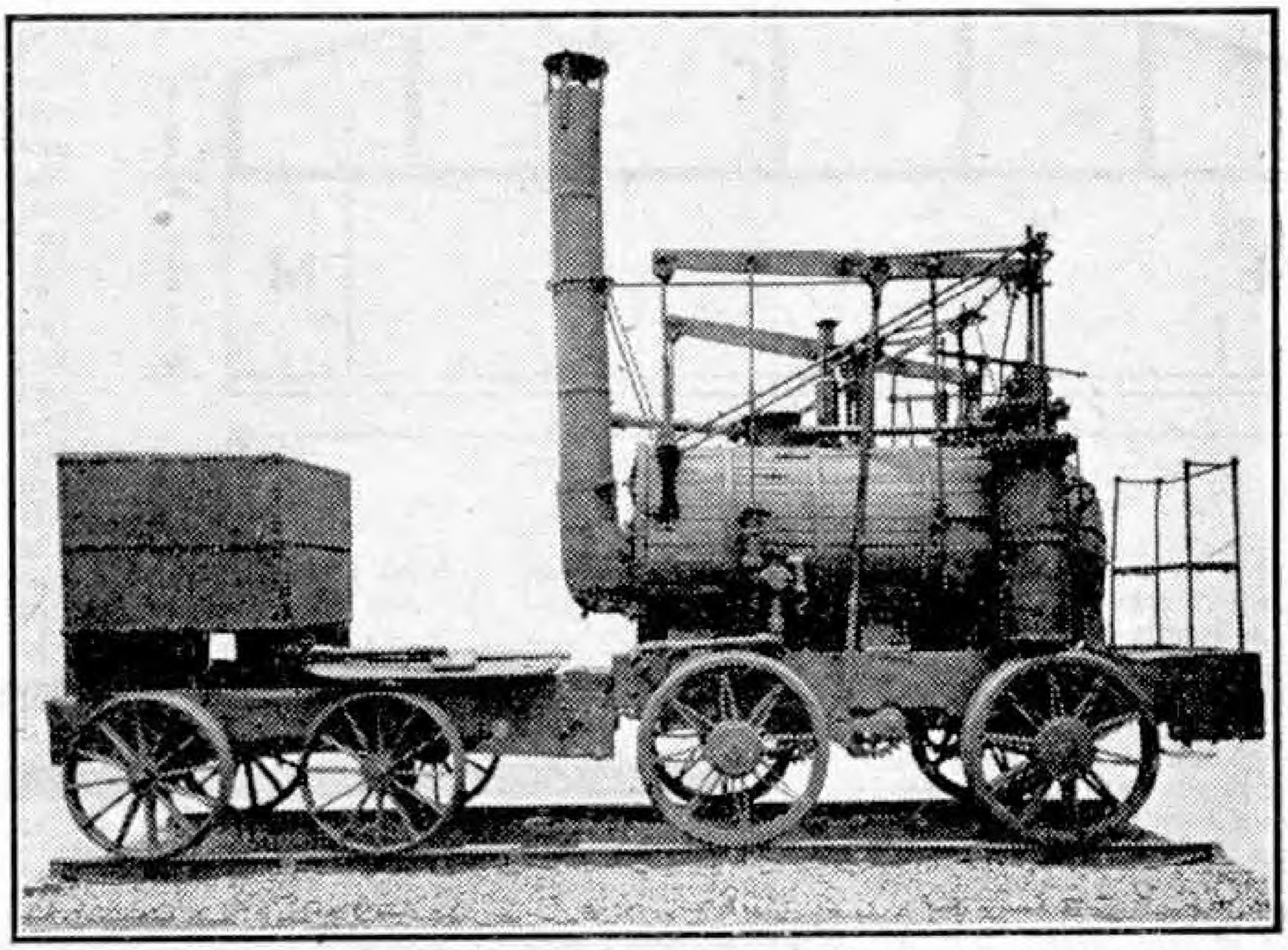
Trevithick's experiments had shown that a load could be hauled by a locomotive by the adhesion weight of its wheels on the track, but his engines were too light to provide the adhesion necessary to haul a commercially profitable load. Another trouble was that the tracks on which their trials were carried out were not strong enough, and broke up under the strain. It seemed clear to the men who were then working on the steam locomotive problem that adhesion alone was not practicable, and so in 1811 we find John Blenkinsop, viewer of Middleton colliery, near Leeds, taking out a patent for a kind of rack railway. He fitted to an engine of the Trevithick type a cogged driving wheel that worked into the projecting lugs of the rails along one side of the way. In this manner he enabled the engine to exert five times the tractive power of the Trevithick engine. Blenkinsop's system proved successful, and engines of this type ran for a considerable period on the Middleton and Coxlodge wagon ways and elsewhere.

Blackett watched the introduction of Blenkinsop's railway with keen interest,

and probably would have adopted the system for his Wylam wagon way but for the heavy cost involved in relaying this with cogged edge rails. Apparently, however, he was not satisfied that the rack system was really necessary, and here Hedley comes into the picture. In 1812 Hedley carried out a series of tests, with an experimental carriage worked by manual power, to determine the relation between the weight of a locomotive and the greatest load it was capable of moving from rest. He found that a locomotive light enough to run with safety on the Wylam wagon way would be capable of hauling, by the adhesive weight of its wheels, a commercially profitable load.

With the encouragement of Blackett, Hedley now set out to construct a locomotive, assisted by Jonathan Foster, the colliery enginewright, and Timothy Hackworth, the blacksmith. This was the same Hackworth who built the locomotive *"Royal George"* in 1827, using parts of an earlier engine, and whose *"Sans Pareil"* competed against Stephenson's *"Rocket"* in the Rainhill trials of October 1829. This engine of Hedley's is generally identified with *"Puffing Billy,"* completed in 1813 and now in the Science Museum, South Kensington. It ran between Wylam colliery and the staithes at Lemington, a distance of about five miles. It proved a success, hauling some 50 tons at a speed of five miles per hour. Unfortunately it rapidly broke the cast iron Wylam rails, and in 1815 it was rebuilt as an eight-wheeler. In this form it worked well for some 15 years, when the track was relaid with edge rails and the engine was given its original four-wheel arrangement. Hedley followed it with another locomotive, *"Wylam Dilly,"* now at Edinburgh. *"Puffing Billy"* remained in service until 1862, and *"Wylam Dilly"* until 1867.

It is interesting to learn that Hedley's locomotives caused considerable local excitement and annoyance when they were first introduced, on account of their smoke and noise. We are told by O. D. Hedley, in his book *"Who Invented the Locomotive?"* that sparks often flew out of the chimney with such velocity as to set hedges and grass on fire in summer time. "On one occasion, in the year 1825, they ignited a fine hedge. The occupier of the property came with a fowling piece and threatened to shoot the drivers, who were so alarmed that they refused to go down with the engine, and a person had to go from the colliery and appease the wounded feelings of the party, or, as it was termed, to make peace." This trouble was afterwards got rid of by making the exhaust steam pass through a separate chamber before it was discharged into the chimney.



"Puffing Billy" locomotive, 1813. From the locomotive in the Science Museum, South Kensington, London. Crown Copyright.

Hedley's interests were not confined to locomotives. In 1808 he became a shipowner in a small way, and subsequently owned several vessels. His energy and enterprise were well shown in 1823 when a serious strike of the Tyne keelmen took place. These men were responsible for the carrying of coal from the upper part of the river, and their strike, which lasted 10 weeks, caused great industrial disturbances. Hedley had a locomotive taken off its wheels, fixed on board a keel at Newburn, and fitted with paddles. The driver of the engine went with his charge, and the keel was used to tow other keels between the ships *(Continued on page 214)*

Building a Model Bridge

By Christopher Evans

MANY fine models of bridges can be made out of match sticks and match boxes, and although matches are at present very scarce, it should still be possible to collect quite a large number if you are really enterprising.

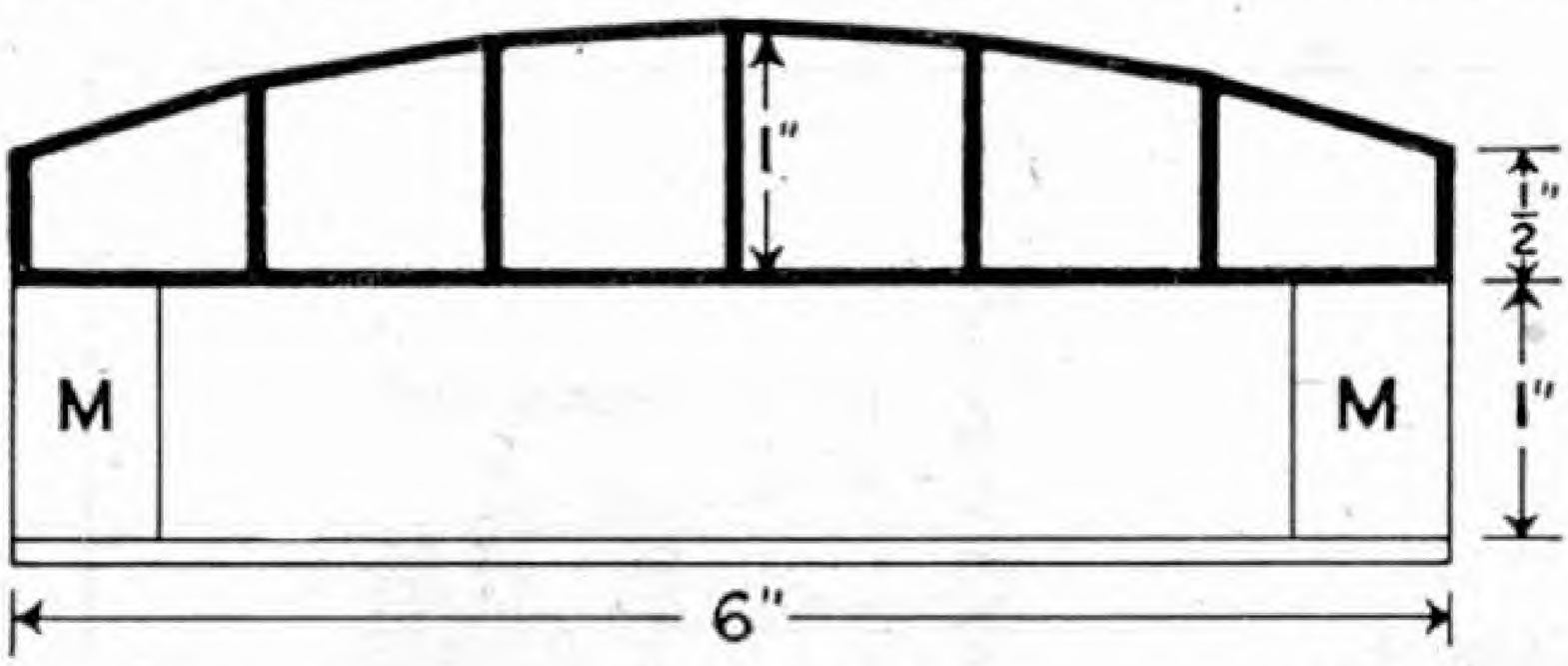


Fig. I

The details given here are for an extremely simple model, but if you are successful with this model you should find it very easy to make larger and finer models of your own design.

The only materials you will need are a quantity of used matches, the outside cover of one match box, a piece of wood or stout cardboard, a sharp knife or razor blade, and a tube of good strong glue.

When you have collected a lot of matches, cut off the burnt ends and they are then ready for use. Do not cut off more of the match than is absolutely necessary, as long matches make the model very much simpler to make.

The dimensions given are for a model of 6 in. long and 1½ in. wide. The first thing you will require is a base board, which you make out of the wood or stout cardboard, and which should be rather larger than the actual model; 7 in. by 2 in. is a good size.

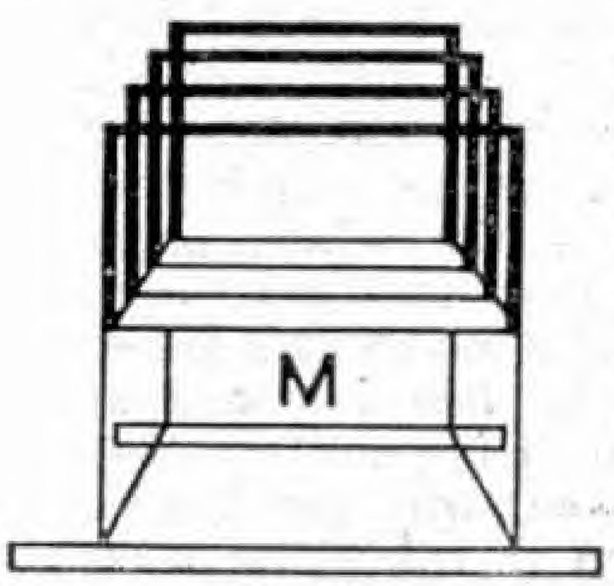


Fig. V

Take the outer cover of your match box and cut it into two pieces each 1 in. long then glue these two pieces to the base so that they are just 6 in. apart as in Fig. I.

By the way, in the figures the heavy black lines and the dotted lines represent match sticks. The letter M indicates a match box.

Next join together a number of match sticks in the way shown in Fig. II until you have a piece 6 in. long. You will have to do this twice as two pieces like this are required. Stick these two pieces on top of the match box as shown in Fig. III.

At distances of 1 in. along these sticks erect other upright sticks as shown in the shaded part of Fig. I., making the end ones ½ in. tall, and the others gradually getting bigger until the middle one is 1 in. tall. Join these sticks together in pairs as shown in Fig. IV, and then join them together again lengthways so as to form a curved rail along the top of the bridge. Looked at from the side, the model should now appear like Fig. I, and looked at from the end, like Fig. V.

For the track of the bridge you will want some thin cardboard; the outer cover of a match box will do very well for this, and you should stick this between the parts marked X in Fig. III. If your model is to be a road bridge it is now finished except for the painting; if, however, it is to be a railway bridge you stick four sticks, made as shown in Fig. II, along the cardboard to represent the railway lines.

FIG. II

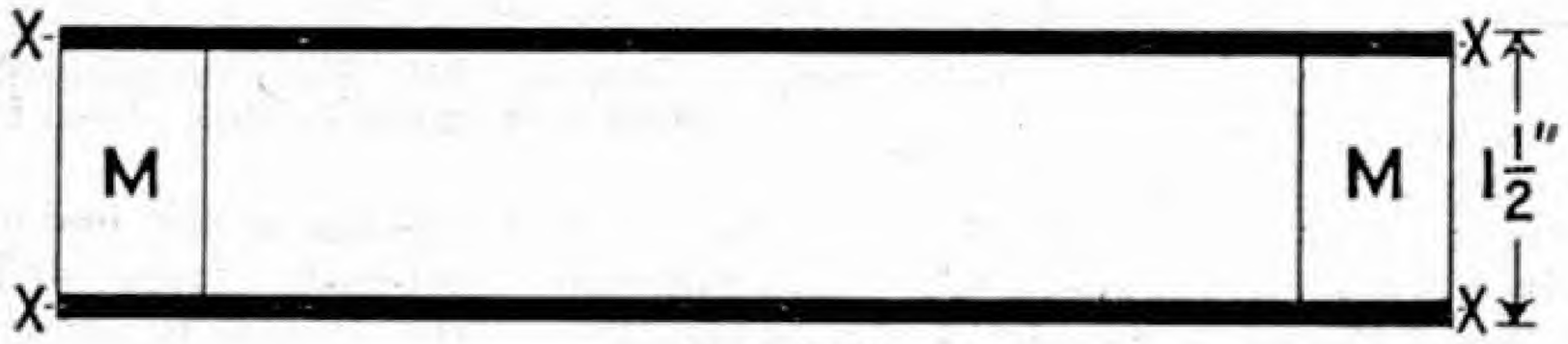


FIG. III

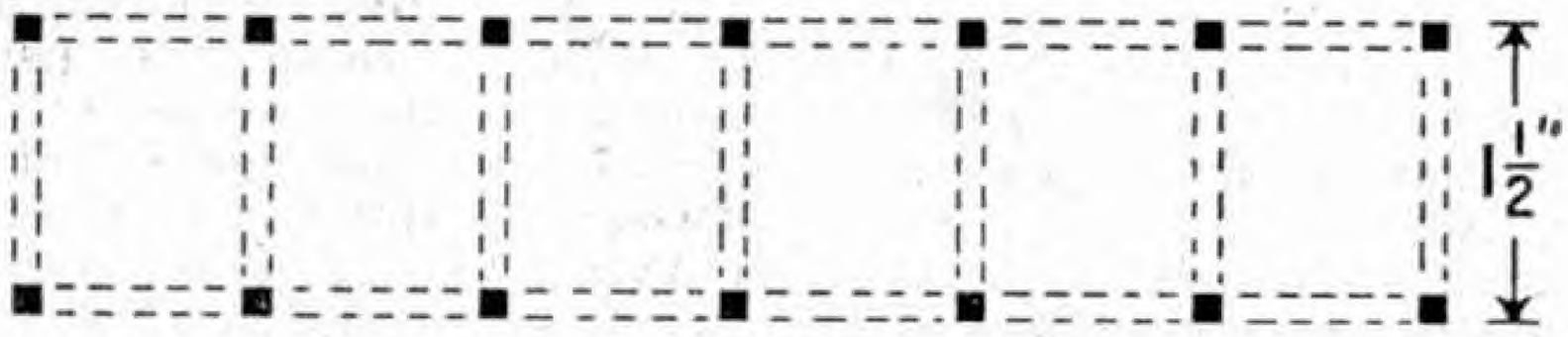


FIG. IV

You can then paint the model any colour you like, but grey or black will give the best effect. If it is a road bridge you could paint a white line down the middle of the track to add realism to the model.

This simply-made bridge, correctly painted, makes a useful Hornby railway accessory, and in fact it is seen to best advantage when set astride Hornby track. Built to the size given in Fig. 1 the bridge will span two Dublo tracks or a Gauge 0 one, and if made 2 in. longer it will span two Gauge 0 tracks.

Engineering News

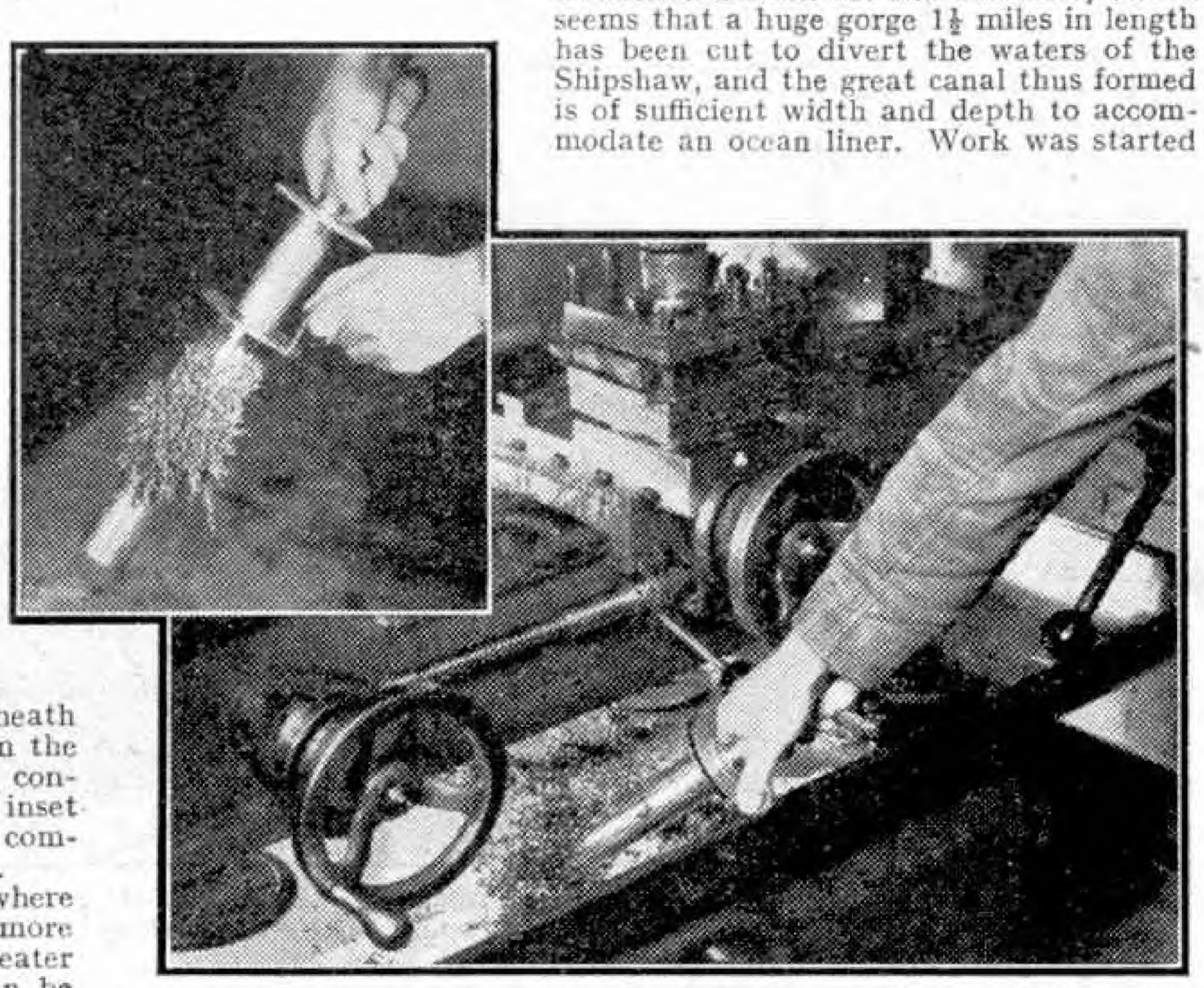
An Ingenious Magnetic Skimmer

In the January "*M.M.*" we described and illustrated a magnetic filter produced by Philips Industrial (Philips Lamps Ltd.) for removing fine particles of iron and steel from the liquid used for lubricating and cooling purposes in machine tool operations. Now we are able to illustrate a magnetic skimmer made by this firm. It is an exceedingly useful appliance, which has been designed to enable ferrous sludge to be removed with ease from settling tanks and other places where such contamination collects and from which it should be removed. It is also excellent for removing the ferrous particles which often form themselves into scum floating on the top of coolants in settling tanks.

The standard type magnetic skimmer illustrated here consists of two permanent magnets, of the special magnetic alloy known as Ticonal 42/50, enclosed in a non-ferrous tube 9 in. long, and fitted with a handle. Over this tube fits a removable non-ferrous sheath. If the magnetic assembly were to be used without the sheath, difficulty would be experienced in removing the ferrous contamination. To operate the skimmer, therefore, the sheath is placed in position and held there by the operator's thumb. The skimmer can then be placed into the liquid from which it is desired to remove ferrous particles, and these will collect around the outside of the sheath, as shown in our illustration.

For cleaning purposes, it is only necessary to slide the sheath off, and as it is then away from the magnetic field, the ferrous contamination will fall away. The inset illustration shows an operator commencing to remove the sheath.

In some cases, as for example where the depth of the coolant is more than 9 in. a skimmer of greater length is required, and they can be supplied with lengths up to 21 in.



Removing ferrous particles from coolant used in machine tool operations. The magnetic skimmer used is covered with a non-magnetic sheath, which is afterwards removed, as shown in our smaller illustration, so that the metal particles picked up can easily be removed. Photograph by courtesy of Philips Lamps Ltd.

British Tugs Built in Sections

Details are now available of the building of 70-ft. British all-welded tugs in sections or units that afterwards were welded to complete the vessel. This method has been largely adopted in the United States and it is interesting to find that good use of it has been made in this country also. The purpose is to speed up production, and also to disperse the constructional work, and the units have been made in engineering works away from the shipyards where the final assembly has taken place. Some 13 different firms were concerned in the work, each building one or more 10 ft. sections. The greatest weight of any unit was 6 tons, and the greatest breadth and height were 17 ft. and 13 ft. respectively. The units were too large for transport by rail and were taken to the shipyard by road.

The constructors worked to specially prepared drawings, designed for use by workmen with no shipbuilding experience. Each unit was complete in itself on arrival at the shipyard, and they were united by means of butt joints, the ends of the units meeting with no overlapping or staggered sections. Assembly was carried on by means of a rough gantry crane, each unit being lifted off the lorry and laid in its prepared position across keel blocks. The units were then welded together, and the engines and boilers were installed after launching. Each tug is fitted with reciprocating engines of about 220 i.h.p., giving a speed of 7 to 8 knots.

A Giant Canadian Hydro-Electric Plant

One of the best kept secrets of the war has been the construction in Canada of a gigantic dam for power production. The hydro-electric power to be developed is about 1,200,000 h.p., and this is to be used to increase the production of aluminium in Canada from 50,000 to 500,000 tons a year.

The new plant is on the Shipshaw River, which flows into the Saguenay, a tributary of the St. Lawrence. Details are not available, but in seems that a huge gorge 1½ miles in length has been cut to divert the waters of the Shipshaw, and the great canal thus formed is of sufficient width and depth to accommodate an ocean liner. Work was started in the autumn of 1941 and was carried on throughout two winters in spite of temperatures as low as 50 deg. F. below zero. Its scale was gigantic, the total quantity of material excavated being nearly 6,000,000 cu. yds., and more than 1,000,000 cu. yds. of concrete being required. At one time over 10,000 men were at work on the scheme. A solid block of rock at the intake point, between the river and the great canal, required a charge of 83,000 lb. of dynamite to blast it.

Eventually 12 generating units of 100,000 h.p. each will be installed in the powerhouse, and two of these are already complete and in operation. With the flow of water at its lowest level the power produced will be as much as 970,000 h.p., an unusually high percentage of the maximum. The reason for this is that the feed water for the canal runs out of a lake 400 sq. m. in area, which receives the run of water from an area of 28,000 sq. m.

Railway News

Southern Running Notes

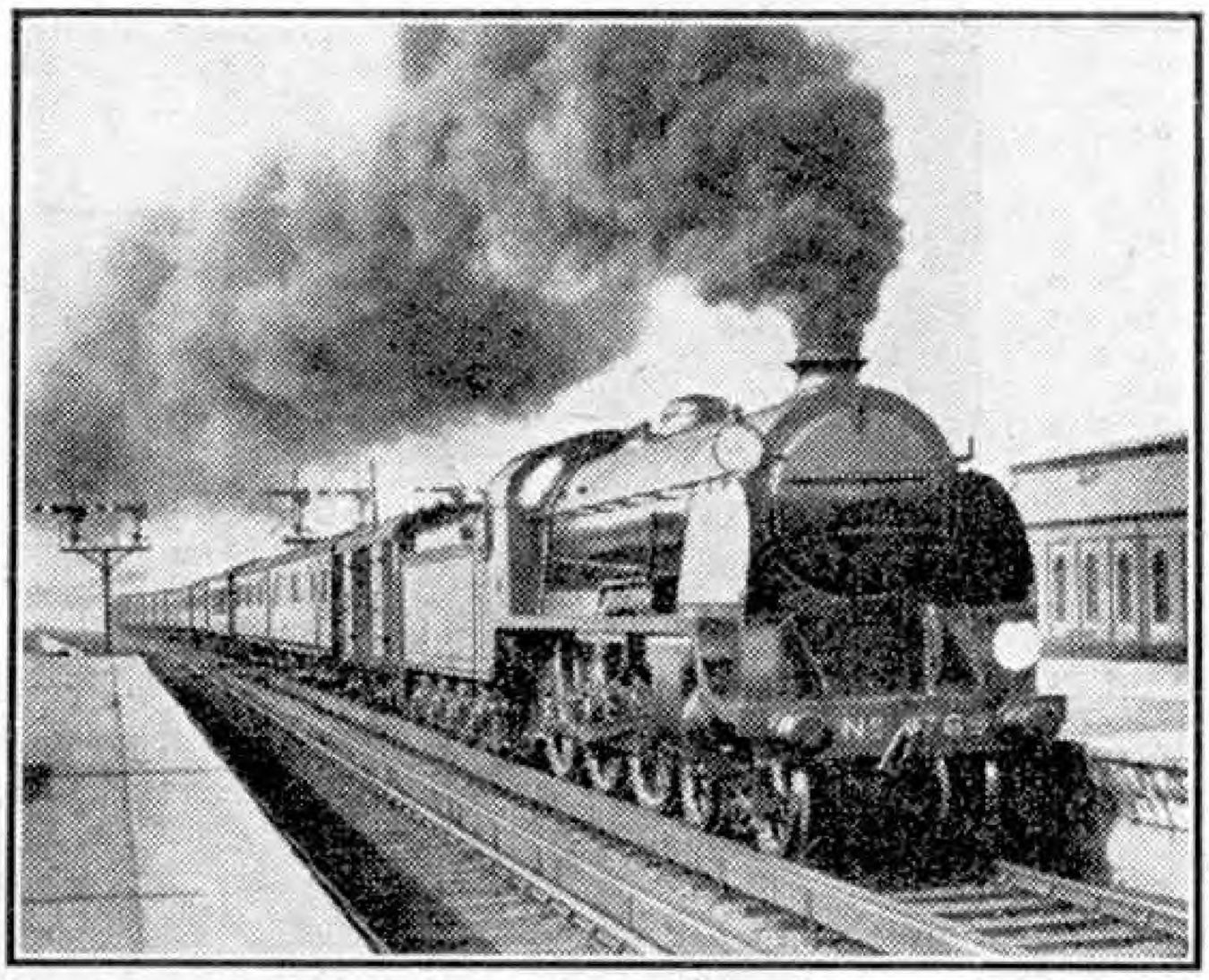
"Lord Nelson" class 4–6–0 No. 857 "*Lord Howe*" is now again running with the larger boiler having round topped fire-box, somewhat similar to that fitted to L.N.E.R. "Pacifics," that she had carried for some years prior to her previous visit to works for overhaul. It is interesting that now for the first time locomotives of this class are regularly stationed at a provincial shed; hitherto they having always been shedded in London, Eastern or Western sections. Nos. 850–855 have gone to Bournemouth, so taking up the working of the principal Bournemouth-Waterloo expresses that had been handled lately by "Schools" 4–4–0s. It will be remembered that some years ago the latter type replaced 4–6–0 "King Arthurs" on those duties with great success, but the present heavy loads and more frequent stops have rather overtaxed "Schools" which are not always in best condition. Five of these pre-eminent British 4–4–0s are now stationed at Basingstoke in succession to Brighton "Atlantics." Three of the Wainwright ex-South Eastern and Chatham 0–4–4 passenger tanks numbered 1177, 1184 and 1259 are on loan to the L.M.S. in Scotland, and have been working in the Forfar-Arbroath district.

Only one of the "N15x" 4–6–0 express engines remains on the Southern at present, while the remainder are on loan to the G.W.R. This is No. 2333 "*Remembrance*," which as a 4–6–4T was the last locomotive built for the former London, Brighton and South Coast Company in 1922. There are however two other Brighton express tanks which after a sojourn at Basingstoke on the Western Division are now back in their own territory, and have lately been working the heavy 6.10 p.m. Victoria-Tunbridge Wells West over the steeply-graded Oxted route.

The first of these two 4–6–2Ts was turned out in 1910, named "*Abergavenny*" and numbered 325, now 2325. It was the first tank engine proper built at Brighton with outside cylinders since 1868 and is of handsome appearance. The driving wheels are 6 ft. 7½ in., cylinders 21 in. diam. by 26 in. stroke with piston valves actuated by Stephenson gear; the total heating surface, including superheater, is 2,067 sq. ft. This engine is now class "J1." The second example, Class "J2," also having a class to itself, bears the next number and was named "*Bessborough*," but the nameplates of both have been removed. The principal difference is the fitting of Walschaerts gear, so making this locomotive unique at Brighton at the time.

Both these "Pacific tanks" had the reputation of being quick starters and fast, reliable performers on the express services between London, Brighton and other South Coast towns when steam operated. For instance "*Abergavenny*" with 295 tons after a fast start uphill from Brighton attained 52½ m.p.h. up the 1 in 264 to the south end of Clayton tunnel and touched 71½ on the similar though partly level 5 miles down to Wivelsfield; then it went up the 8-mile rise to Balcombe Tunnel box, mostly at 1 in 264, without dropping below 50 and followed this in customary style by a maximum of 74 down past Horley. A corresponding rise, partly at 1 in 200, follows up to Quarry summit at Merstham New Tunnel north end, on which speed kept above 50 m.p.h., after which easier running down to Croydon and over the varying gradients through the suburbs brought the train into Victoria 2½ min. before time, in 57½ min. for 51 miles.

Southbound trains have harder climbing to face in the first 17½ miles up to Merstham Tunnel. On one occasion, with the "*City Limited*" starting from London Bridge terminus after corridor stock had been introduced to these services by the S.R., the other engine with Walschaerts gear had a load of 345 tons and was checked by signals on the 1 in 100 of Forest Hill bank soon after starting. It then suffered further checks and slow road diversion, but even so was only 2 min. late at Merstham Tunnel and Quarry Box. An uphill minimum of 53 m.p.h. at Balcombe between two maxima of 74 and 75 respectively near Horley and Wivelsfield, followed by a spirited finish, brought this substantial train into Brighton ½ min. early, in little more than 55 min. net for the 50¾ miles from London Bridge.



The down "Ostend Continental," headed by "King Arthur" No. 769 "Sir Balan," passing Orpington, Kent. Photograph by C. Stevens.

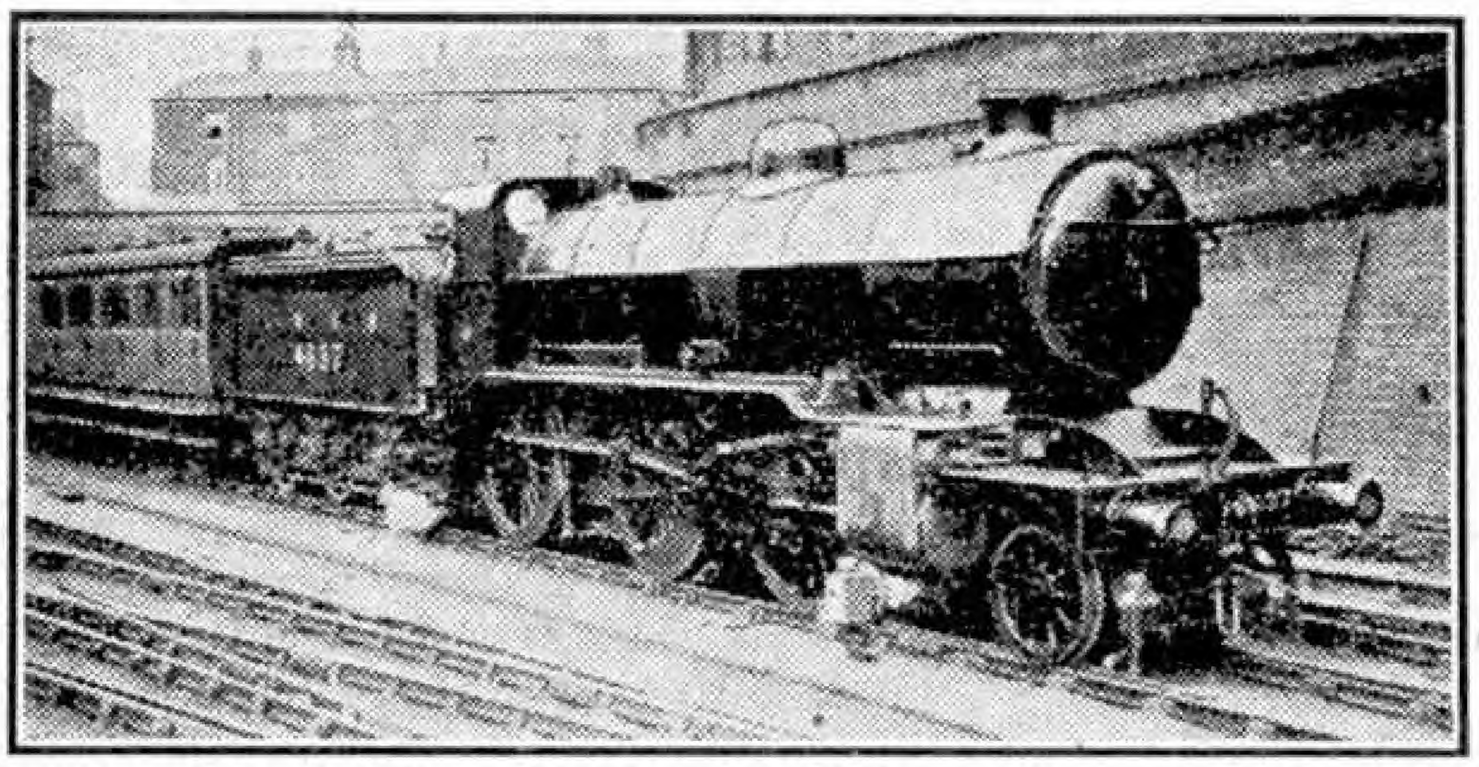
L.M.S. Locomotive News

New 2-cyl. 2–6–4Ts numbered 2669–70 and 2672 are at work in the Potteries area. Four 2–6–2Ts so far noted with enlarged and more powerful boilers, as illustrated and described in the May 1941 issue of the "*M.M.*" are Nos. 148, 163, 169 and 203. Further standard "8F" 2–8–0 freight engines built in the company's works are Nos. 8158–63. "Royal Scots" have been seen as far south-west as the Gloucester-Bristol section of the Midland division on special trains, and also working locally for a short time. At the time of writing express locomotives stationed at Crewe included 10 "Pacifics," 27 "Royal Scots," 13 "5P" Stanier 3-cyl. 4–6–0s and 14 "Patriots."

Midland and L.M.S. "3P" 4–4–2Ts Nos. 2110–60 are seen operating the London, Tilbury and Southend traffic; a few Stanier 2–6–4Ts such as Nos. 2501–3 also still taking turns on passenger trains. A few of the older "2P" 4–4–Ts, which were originally built for the fast Fenchurch St. to Southend workings, now haul local goods in turn with the 0–6–2Ts in this region, the longer freight duties being handled by the ubiquitous Midland class "4" 0–6–0s.

Great Western Tidings

No. 6014 "*King Henry VII*" does not now carry the partially streamlined casing and bullet-nosed



L.N.E.R. Class "K2" ex-G.N. 2-cyl. 2-6-0 locomotive on a Derby train.

smoke-box which had rendered this particular engine conspicuous during recent years, although the wedge-shaped cab and modified splashers remain. Recent observations have indicated that U.S.A. War Service 2–8–0s built by the American Locomotive Company and numbered 1601–24, as well as Nos. 1835–6 built by the Lima Locomotive Company, are in service on the G.W.R., in South Wales and the Midlands. There are also some small American-constructed six-coupled tank locomotives. More Dean 0–6–0s appear to have been transferred to the Ministry of Supply stock. Many Great Western engines work to Crewe often from long distances, including representatives of the "Grange" 4–6–0 class and also of the various 2–6–0 and 2–8–0 series.

New engines reported in service are 0–6–0 pannier tanks Nos. 4638–48, 2–8–0 goods up to No. 3866, and 4–6–0 unnamed "Halls" to No. 6953.

Increased Sleeping Car Accommodation

A second berth has been fitted in each end compartment of 18 L.N.E.R. first-class sleeping cars to provide 36 additional berths. The two berths are installed one above the other, a light step ladder being provided to give access to the upper one. Separate bedside lights are provided for each berth. Under war conditions the number of sleeping cars available on night expresses has had to be cut considerably, and the two-berth compartments provide additional accommodation without adding appreciably to weight. The demand for berths usually considerably exceeds supply.

In consequence of the success of the initial experiments in this direction carried out by the L.M.S. last year, all the cars in regular service on the West Coast Route are being similarly equipped.

Tons of Coal Saved by Coasting

In order to economise current it is customary to accelerate multiple-unit electric trains rapidly and then on suitable grades to shut off power and coast to the point at which brakes have to be applied for the next stop. By calculation and experience, L.M.S. officials have determined the most economical points along the routes and have had coasting boards to indicate these points fixed at the lineside to assist motormen. As a result it is estimated that over 8 tons of coal are saved each day at the power stations supplying the London-Watford passenger services. Similar plans were brought into operation during the war of 1914–18 upon the introduction of electric working on certain suburban lines of the former London and South Western Railway, and have since been encouraged by the Southern authorities.

Communicating Signals in the U.S.A.

On the railroads of the U.S.A. there is a standard bell-code of communicating signals from the train to the engine cab. In this code two short rings indicate "Start" when standing, or "Stop at once" when running. Three short rings mean "Hook back," that is ease couplings, when standing; or "Stop at next passenger station" when running. One long ring when running indicates "Brakes sticking: look back for hand signals."

British Sugar by L.N.E.R.

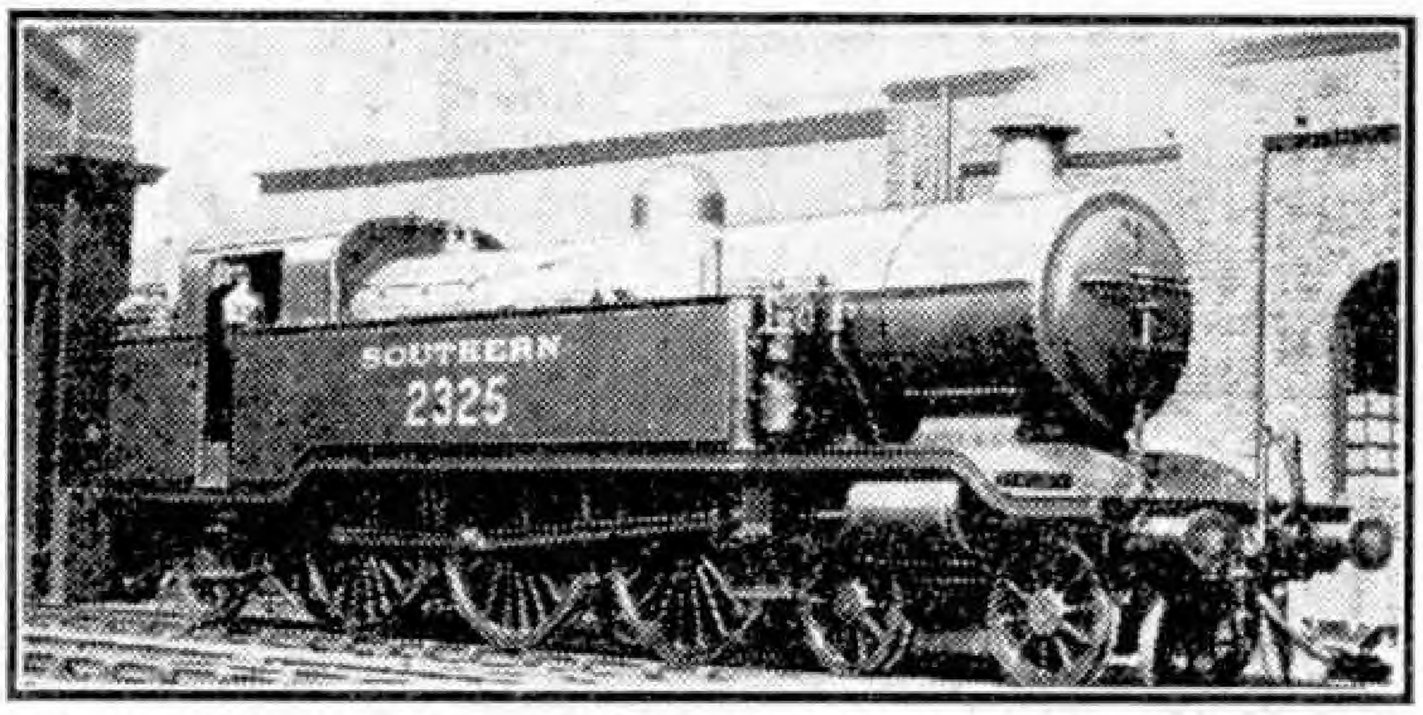
A large proportion of the sugar used in British households is now home produced, and 15 large factories producing sugar from beet grown in the Eastern counties have received by L.N.E.R. freight trains well over 1,120,000 tons of sugar beet. During the busiest period of last autumn more than 1,000 wagons per day were needed for this traffic alone.

A Million Tons of Pit Props by L.M.S.

One million tons of timber pit props taken from Scottish forests were forwarded to collieries in Great Britain by L.M.S. goods services last year. This is more than half of the total tonnage imported from overseas during the pre-war years, and provides yet another example of the vastly increased volume of freight traffic which our railways are handling in unaccustomed directions.

S.R. Notes from Basingstoke

No. 21C10 "*Blue Star*" of the "Merchant Navy" 4–6–2 class appears to have been modified externally at the front end, possibly with the idea of improving the lifting of the exhaust well clear of the cab. The alterations, which do not interfere with the "air-smoothed" outline of the design, appear to include the fitting of a baffle plate inside the arched top of this hood. The latter comes to an end level with the rear of the chimney, but is not made flush with the original casing, so that there is a gap between the two sheets, apparently with the idea of inducing an upward draught immediately behind the chimney.



S.R. No. 2325 "Abergavenny," of the "J1" 4-6-2 express tank class. This is a former London, Brighton and South Coast engine.

No. 931 "*King's Wimbledon*" of the "Schools" class now has a tender similar to those provided for the "Q1" or "Austerity" 0–6–0s. No. 932 of the same class, "*Blundell's*," has a high-sided tender similar to that of some of the "Nelson" class.

P. F. Barnes.

* * * *

Over 1¼ million loaded wagons travelled 136 million miles over the L.M.S. in a recent four weekly period.

Photography

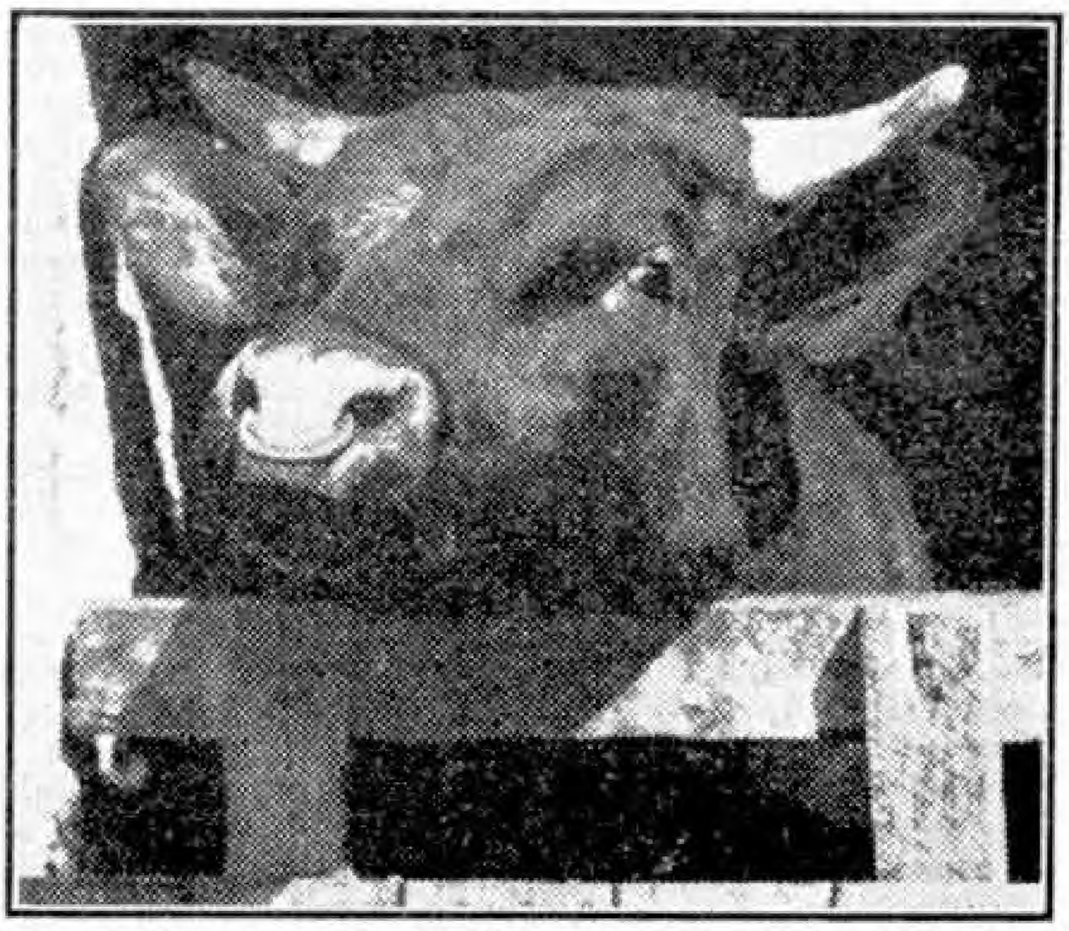
Our Animal Friends

By A.R.P.S.

MOST readers at some time have a desire to take photographs of their animal pets, or to visit a local Zoological Gardens with the camera to see what sort of pictures they can make of the inmates of these popular places.

Animal studies quite frequently figure as one of the classes in competitions and exhibitions, and some very excellent results are sent in. It is surprising what a number of poor results are received, however; poor because of lack of thought on the part of the competitor. You will agree that a perfect study should give the suggestion of life in the subject, yet innumerable films are spent on cats and dogs asleep on the rug in front of the fire—actually that cat or dog might be a stuffed specimen! How very much more lifelike *"Fido"* or *"Prince"* would look if he were taken in the open, looking up at his master with that eager request on his face to be taken for a run, or waiting for the stone to be thrown, his whole body tuned up ready for action. Or take another much-photographed animal, the horse. Good studies can be got when he is standing in a field or the stableyard, but how very much better he will look when straining at the reins or pulling the plough. Action is the keynote, and is what we should aim for in such studies.

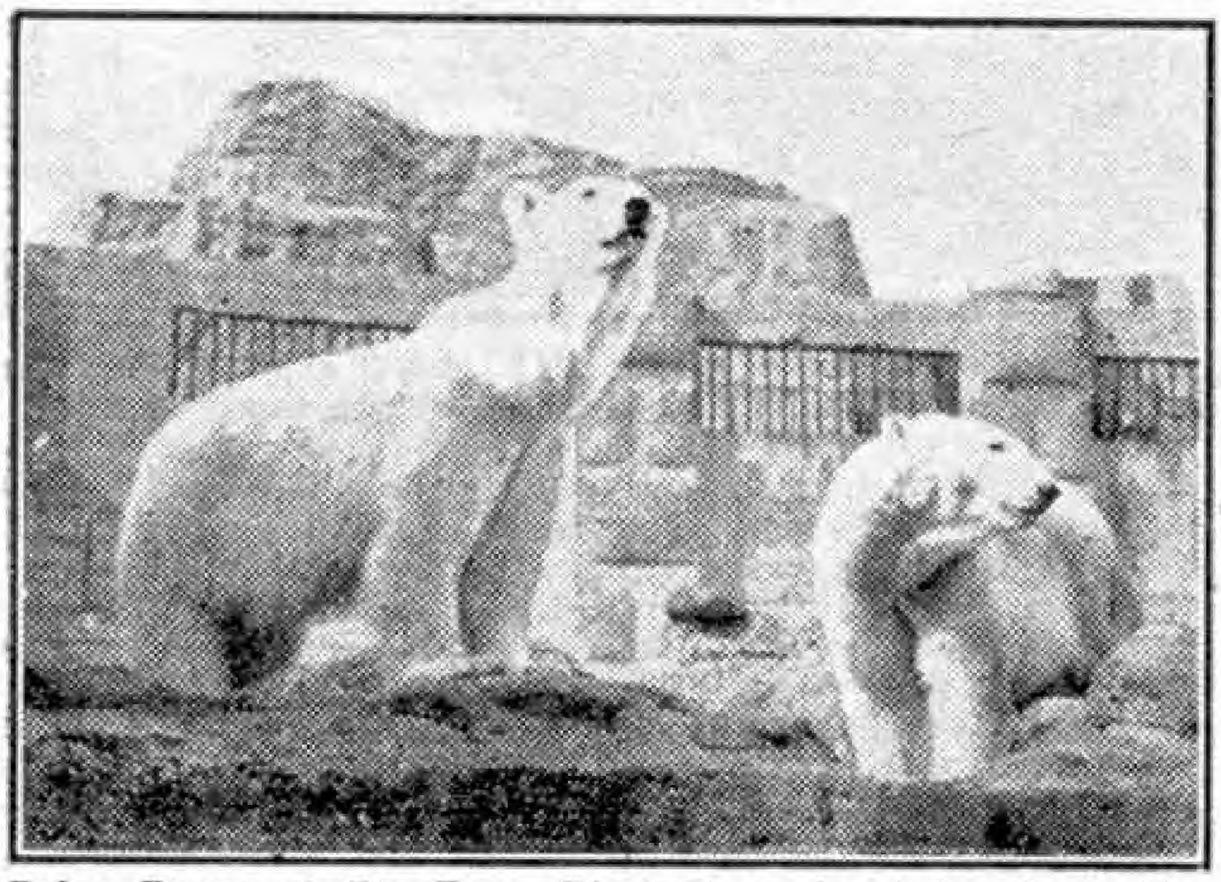
Morning time is the best for Zoo pictures, when there are few people about, and when you can spare the time to wait until your animal is in the right pose. The indoor animals are not an easy proposition, because of the poor light.



"Good Morning, Mr. Bull." Photograph by W. Barr, Birkenhead. The upper photograph is by S. Kassam, Bembridge School, Coniston.

A large stop is necessary, usually F5.6 or F3.8. The open cages are mostly in good light and an exposure of 1/200th at F8 with a Selo H.P.3 should serve the purpose at this time of the year. If you have larger stops, use them, and give faster times to get just that lifelike pose.

Coming back to the horse or dog studies in the open, fast exposure is almost an essential, but F8 stop with 1/250th will be about right if there are no heavy dark trees obscuring the light. Focussing plays a most important part in these studies; measure the distance accurately if you have not a focussing screen on your camera. Another point to remember is that when you are taking a "close-up" of any subject you must increase the exposure; a head taken at 3 ft. would possibly require three or four times more exposure than it would at 12 ft.



Polar Bears at the Zoo. Photograph by John J. Curtis, A.R.P.S.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

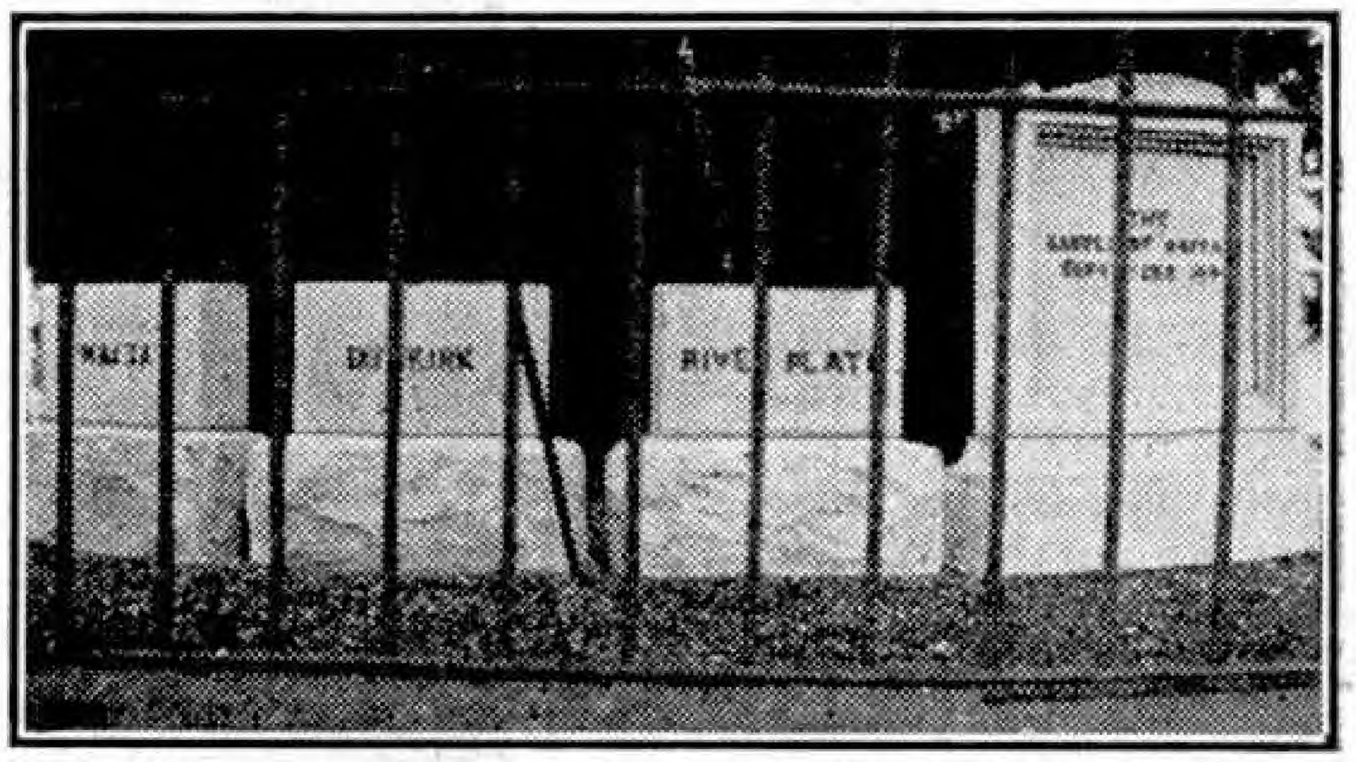
MILESTONES TO VICTORY

There are probably thousands of memorials to the last war, but those built to commemorate the present conflict are rare. In the churchyard of Darley Dale, Derbyshire, simple stones have been erected to pay tribute to great events as they occur. These include the exploit of the "*Jarvis Bay*" and the battles of Calais and Narvik beside those shown in the accompanying photograph.

Darley Dale is famous for its stone and these memorials have been fashioned at the Stancliffe Quarries nearby. Stone from here has been used in many famous buildings, including St. George's Hall in Liverpool, and numerous town halls all over the country, as well as the Thames Embankment.

These simple tributes to the brave are sheltered by an ancient yew tree claimed to be over 2,000 years old.

F. Rodgers (Derby).



Derbyshire memorials of great events in the present war. Photograph by F. Rodgers, Derby.

THE GOLDEN STREET OF THE ALCHEMISTS

In Prague, by the side of the Hradcany Castle, there is a street known as the Golden Street of the Alchemists. In this Rudolf II, King of Bohemia in the 16th century, housed a number of alchemists with the intention of keeping them there until they discovered the secret of making gold for him.

The very tall chimneys, visible in the photograph, were specially built, for each house had its own oven and retort. There is only one room downstairs, and no back door, for the backs of the houses overlook a cliff. It is said that when the alchemists complained that their little houses were stuffy and asked to be let out, Rudolf had them put into wire baskets and swung out over the cliff at the back!

The street housed Cabalists, Rosicrucians and astrologers as well as mere alchemists. Among the famous men concerned were Edward Kelly and Dr. Dee, both of them Englishmen, who professed to raise spirits by incantation, while Kelly claimed to have discovered the Philosopher's Stone. Rudolph gave encouragement also to such famous astronomers as Tycho Brake and Kepler.

At that time, Prague, where this street still stands, or did when I visited it just before the war, must have been one of the greatest centres in Europe for all kinds of primitive science, superstition, and charlatanism. When I was there, a seat was still kept empty for a certain Rabbi Low, who became celebrated at the time of the alchemists as the creator of the "Golem." This was supposed to be an artificial man or "homunculus," which the Rabbi could bring to life whenever he wished. There was evidently some foundation for this story, for some kind of a mechanical robot seems to have existed, and its mechanism was said to be stored in an attic above the Prague Town Hall until a few years ago.

E. Richardson (West Bridgford).

The Golden Street of the Alchemists, Prague. Photograph by E. Richardson, West Bridgford.

SALMON FISHING ON THE DEE

While staying at Connah's Quay, a small town on the Dee, I watched salmon fishers at work. The net, which was 200 yds. long, had tarred cork floats at intervals along the top, and slate weights along the bottom. It had a long rope at each end and was piled on the stern of a rowing-boat in such a way that it could be paid out without obstruction.

The crew comprised two men and a boy. Leaving the boy on the shore holding the rope at one end of the net, the men rowed out and the net began to drop off when the boat reached the end of the rope. A big semi-circle was described by the boat, the net coming to an end a good distance from the shore, and the rope dropping off in its place. Meanwhile the boy walked along the shore. When the boat itself reached the shore the men pulled in the rope and the attached net. The other end of the net was also pulled in, and in about 15 min. the salmon that had been trapped could be taken out.

J. M. Howe (Blackpool).

Suggestions Section

By "Spanner"

(601) Ratchet Free Wheel Movement

("Spanner")

There are many kinds of models in which it is required to transmit a drive in one direction only. Among these are bicycle free wheel mechanisms, clock winding devices and models operated by foot treadles. A suitable drive transmission for incorporation in many models of this kind is the pawl and ratchet movement shown in Fig. 601. In the illustration the mechanism is shown attached to a 3" Sprocket Wheel, but where this is unsuitable the Wheel may be replaced by a 3½" Gear Wheel, large Pulley or a Face Plate. The Sprocket revolves freely on its axle, but is kept in position on one side by the Ratchet Wheel fixed to the axle and on the other by a Collar.

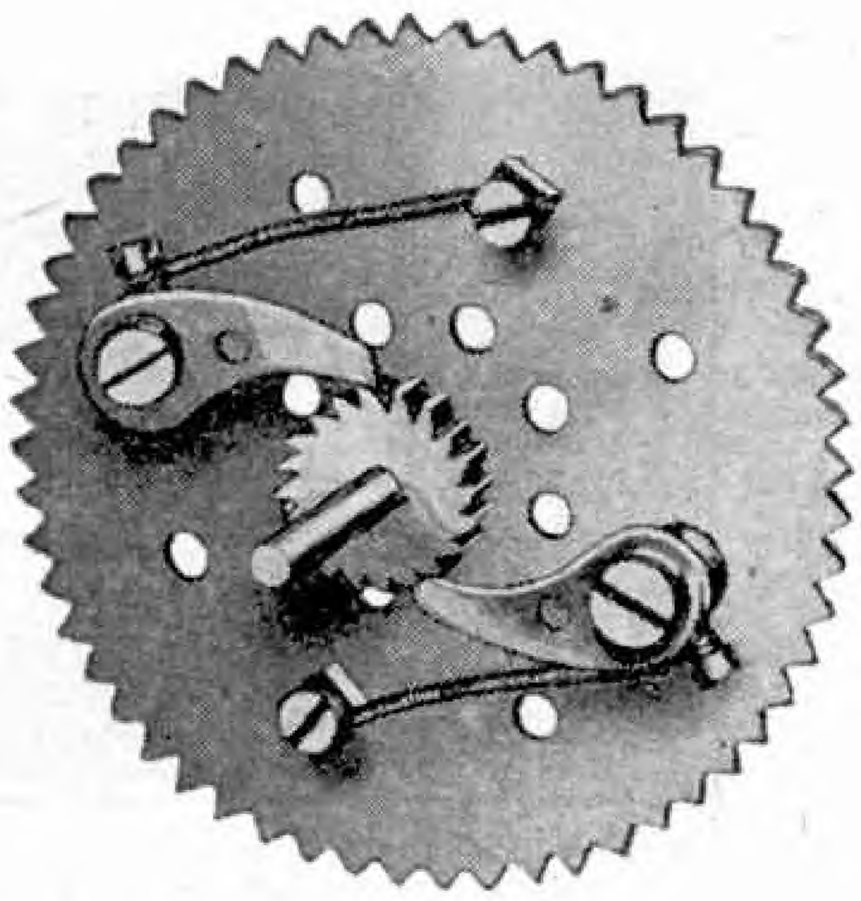


Fig. 601.

Two Pawls are mounted pivotally on the face of the Sprocket by means of Pivot Bolts and lock-nuts, and are held in engagement with the Ratchet by pieces of Spring Cord attached to Set Screws in the Pawls, and also to the face of the Sprocket. With this arrangement the axle and Sprocket Wheel can each move independently in one direction only. The driving power may be imparted initially to either the axle or the Sprocket, whichever best suits requirements in a particular model.

(602) A "Big End" for the Meccano Crankshaft

("Spanner")

The Meccano Crankshaft (Part No. 134) was introduced specially for the benefit of owners of small Outfits who wished to construct model engines. It is of course quite easy to build up a crankshaft from separate parts, and in fact this is the best method, but when only a small quantity and variety of parts are available something more simple is required, and it is in such cases that the special Crankshaft will be found useful.

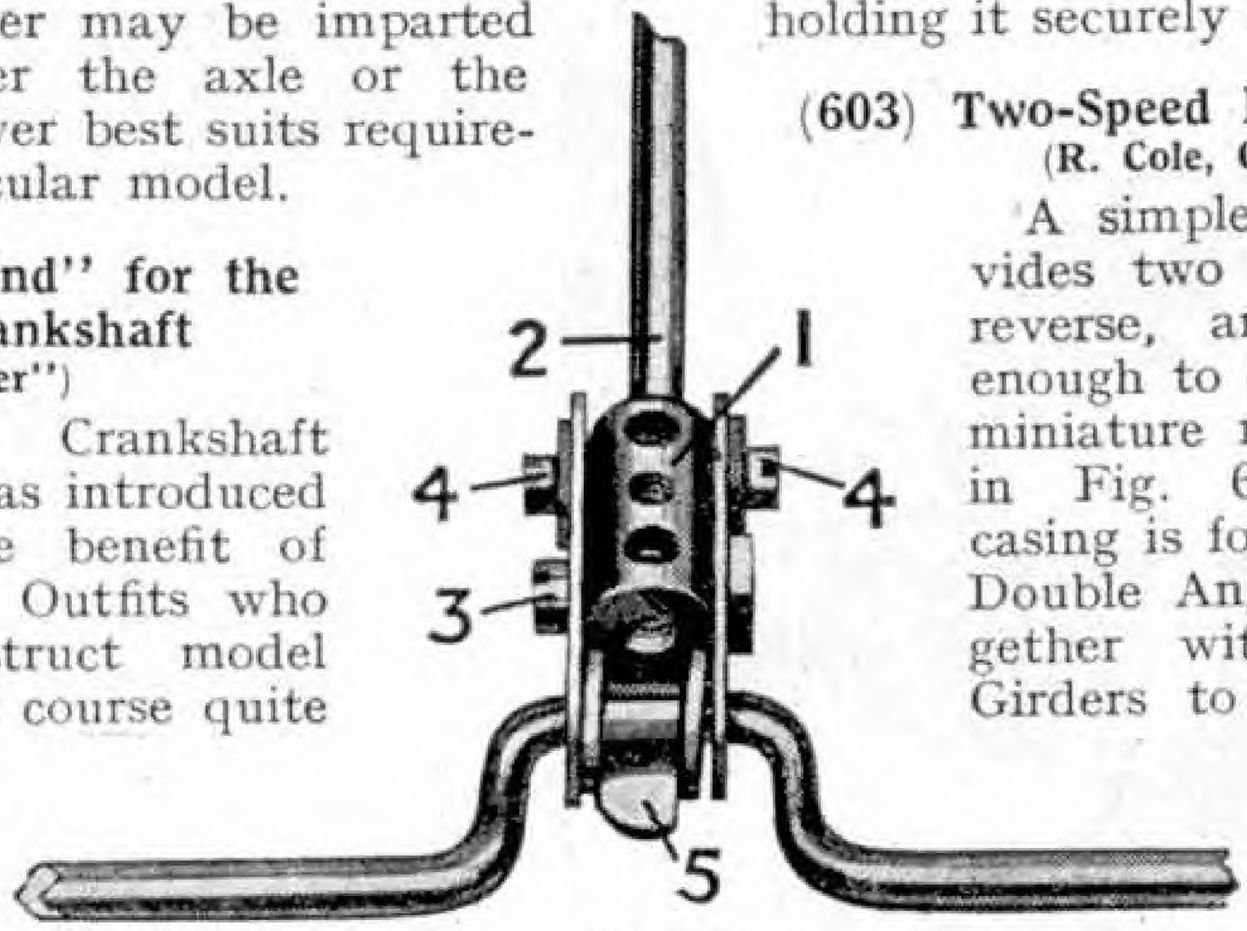


Fig. 602.

The Crankshaft is designed to give a stroke of 1 in., but because it is made entirely from one length of rod younger model-builders may be puzzled to design a suitable "big end" bearing for use with it. Fig. 602 shows one method by which a big end can be built up. A Spring Clip 5 is first slipped on to the centre of the cranked portion of the Crankshaft, and on each side of this a Washer is placed. On the outside of each of the Washers is a 1½" Strip, and the two Strips are connected by means of a Coupling 1. A ½" Bolt 3 passes completely through the two 1½" Strips in their centre holes, and also through the inner transverse tapped hole of the Coupling 1. The outer tapped holes of the Coupling are fitted with Set Screws 4, under the head of each of which a Washer is placed. These Washers space off the Bolts sufficiently to allow the connecting rod 2 to pass into the longitudinal bore of the Coupling easily, a Grub Screw holding it securely in place.

(603) Two-Speed Reverse Gear-Box

(R. Cole, Gateshead)

A simple gear-box that provides two forward speeds and reverse, and which is small enough to be accommodated in miniature model cars is shown in Fig. 603. The gear-box casing is formed of two 2½" × 1" Double Angle Strips bolted together with two 2½" Angle Girders to a 2½" Flat Girder. Flat Brackets are bolted to the turned-up ends of the Double Angle Strip to give

rigidity. The driving shaft 1 is a 4" Rod that is slideable in its bearings and carries a ½" and a ¾" Pinion 2 and 3 respectively.

Before the driven shaft is inserted in the gear-box the reversing pinion 4 is placed in position. This is a ½" × ½" Pinion that is free to rotate on a 1½" Rod fixed in a Collar. The Collar is locked to one of the Angle Girders of the gear-box casing by means of a ½" Bolt, on the shank of which is placed a second Collar and two Washers for spacing purposes.

Movement of the sliding shaft is controlled by a lever consisting of a 2½" Strip lock-nutted to the side of the gear-box and fitted with a ⅜" Bolt, the head of which engages the bosses of the Pinions 2 and 3. The drive may be conveyed to the shaft 1 through a ½" × ½" Pinion mounted on its front end.

The gear-box is now ready to receive the driven shaft. This is a 3½" Rod journalled in the arms of the second Double Angle Strip, and it carries a ½" and a ¾" Pinion 5 and 6 respectively. The various gear trains are obtained as follows. Movement of the lever to the extreme right brings Pinions 3 and 5 into engagement to give top gear. When the lever is central these two Pinions are disengaged and Pinions 2 and 6 are brought into use to give bottom gear. Movement of the lever to the left produces reverse gear, in which Pinion 3 engages the reversing Pinion 4. The latter Pinion is constantly meshed with Pinion 6.

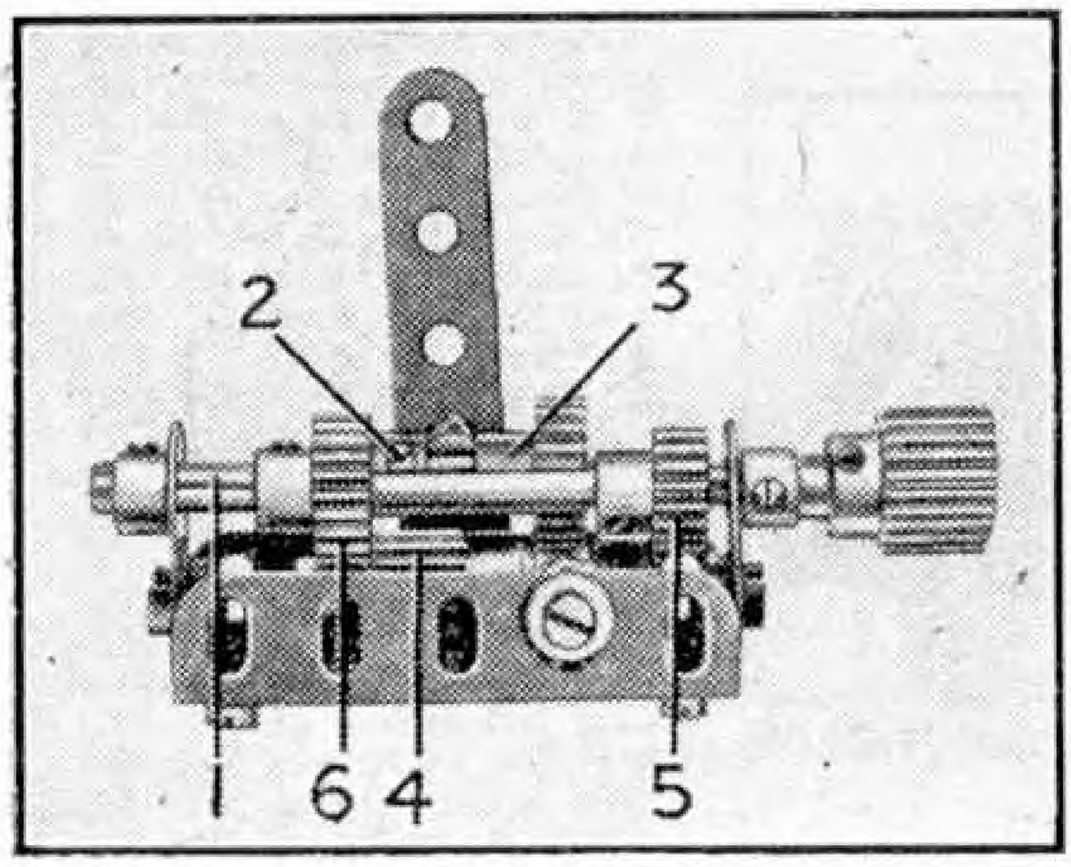


Fig. 603.

(604) Bicycle Carrier

(J. Harris, Bolton)

Now that summer is here again cycling enthusiasts will be looking forward to some good trips, and the wise ones will have seen to it that their machines and equipment are in perfect order so that they will be able to obtain the utmost pleasure from their runs into the country or to the seaside. One of the most useful articles of equipment is a good strong carrier. Unfortunately, owing to the war, cycling spares are rather difficult to obtain in some parts of the country, but a good serviceable carrier can easily be constructed as shown in Fig. 604.

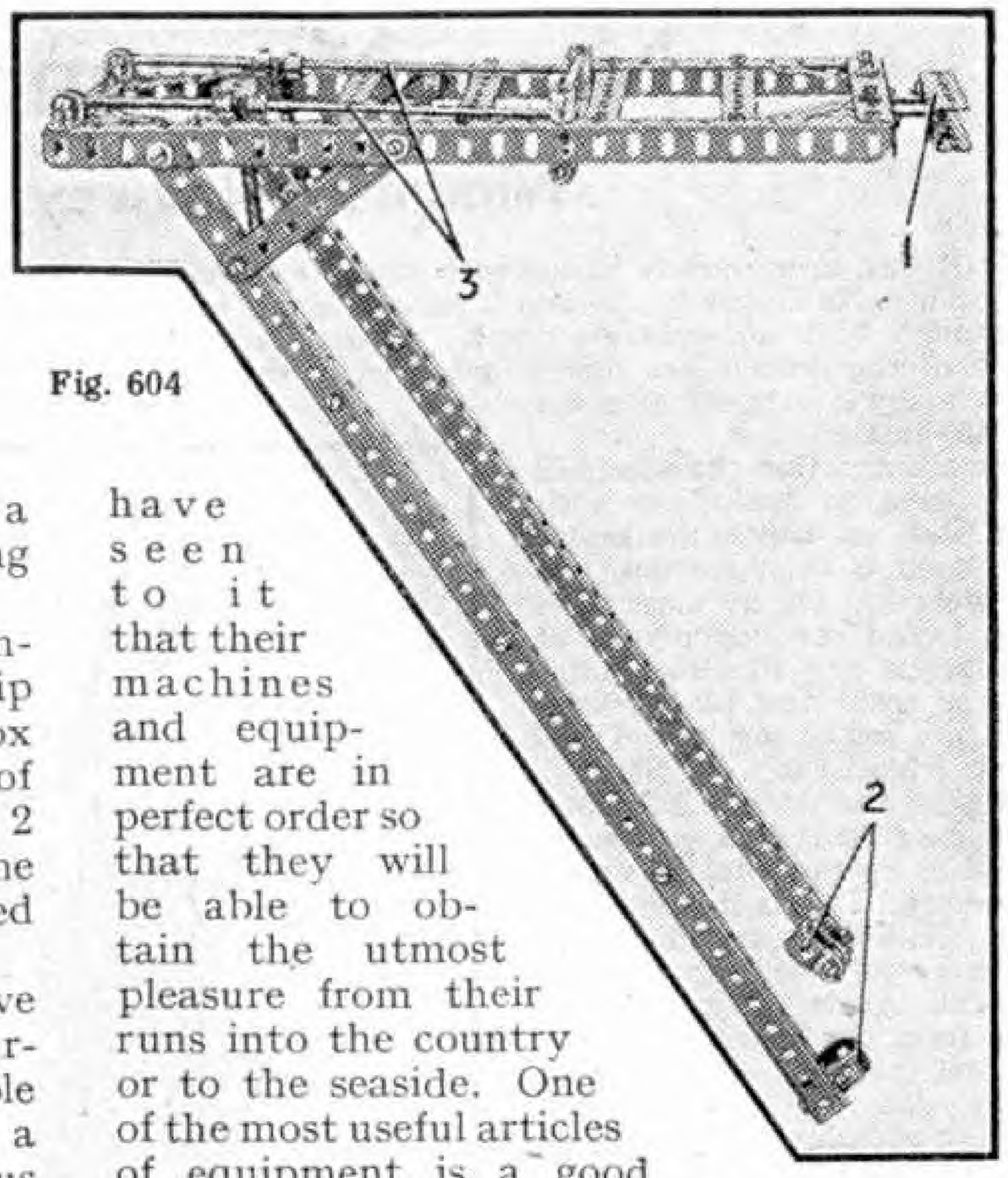


Fig. 604

This carrier consists of a strong rectangular framework built up from 12½" and 5½" Angle Girders bolted together and braced by Architraves, with 5½" Strips bolted at regular intervals across it. The carrier is attached to the bicycle by a U-section girder 1 formed from two 3½" Angle Girders bolted together and fitted with 1⅛" Bolts that pass between the two bars and are screwed into Couplings bolted to the 5½" Angle Girder at the front of the carrier. The rear end is supported by 18½" channel girders formed from Angle Girders bolted together. These are bolted in the positions shown and held rigidly in position by 3½" Strips. Double Brackets bolted to the lower ends of the channel girders are fitted with clips 2 formed from Strips, which should be of sufficient length to fit round the rear fork of the cycle at a point near the axle. A clip to fasten light articles to the carrier consists of two 8" Rods 3 inserted at their rear ends in Collars lock-nutted to Angle Brackets bolted to the carrier. The Rods are fitted with Springs held in position by Collars, their other ends being attached to the channel girder supports. The front ends of the Rods are braced by Couplings fitted with two 1", a 3½" and a 4½" Rod.

New Meccano Models

Windmill—Railway Goods Van

OUR two new models this month are a windmill, built with Outfit No. 3, and a railway goods van. Although both subjects are by no means unusual, each of the models has one or two special features that make it attractive to the model-builder.

In constructing the windmill it is best to commence with the base, on which the building itself is then erected. Its construction will be clear from Fig. 1, and the upper ends of the Strips and Flexible Plates of the front and back of the mill are joined by two Trunnions 1 bolted to a 2½" Strip.

Before the sides of the body are assembled it is necessary to build up the rotating superstructure. This is formed from two Semi-Circular Plates 2, spaced apart by two 2½" × ½" Double Angle Strips, which also form the bearings for the central vertical shaft. Two large radius Curved Plates are fitted round the edges of the Semi-Circular Plates and are strengthened by the addition of 3" Formed Slotted Strips. The wind vane 3 consists of a Flat Trunnion attached by a Rod and Strip Connector to a ⅜" Bolt securing the lower Double Angle Strip to the rear Semi-Circular Plate.

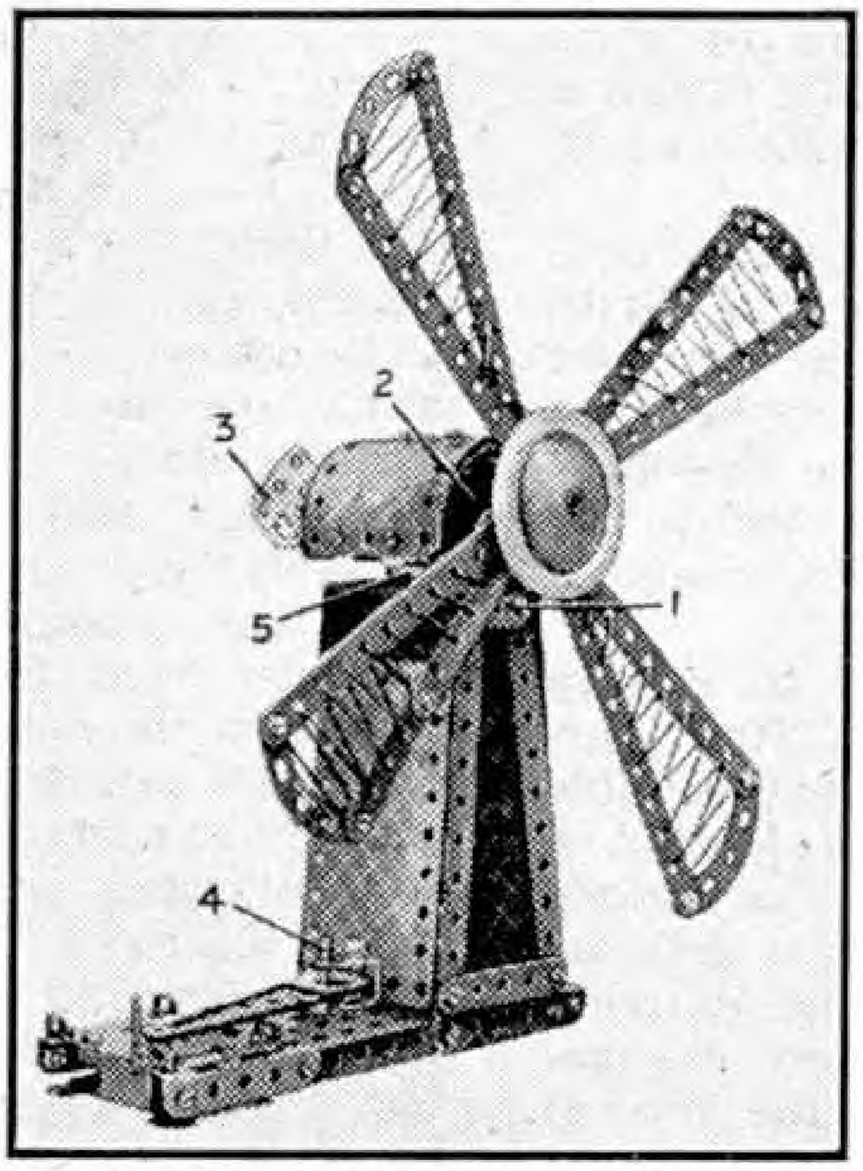


Fig. 1. This model windmill is built with Outfit No. 3, and driven by a Magic Motor.

The sails are attached to a Bush Wheel, the 2½" Strips used being attached by means of 1¼" Discs. The Bush Wheel is mounted on a 2" Rod journalled in the front Semi-Circular Plate and a ½" Reversed Angle Bracket bolted at the back of the Plate. A 1" Pulley shod with a Rubber Ring is placed on the Rod and makes contact with a ½" fixed Pulley on a 4" Rod, which is journalled in the Double Angle Strips of the superstructure. This Rod is inserted in the 2½" Strip at the top of the body, and is connected by a Rod Connector to a further 4" Rod, which is mounted in the base and carries at its lower end a 1" Pulley.

The side plates of the body are now fitted. A 1½" Rod 4 is connected as shown to a *Magic* Motor, which forms the driving unit, and its lower end drives through a Driving Band the 1" Pulley on the lower vertical 4" Rod, a ¾" Disc and Spring Clip preventing it from slipping off. The Flexible Plate is attached at its upper end to a U-section Curved Plate bolted to the top of the body, and similar Plates are attached at the other side.

In connecting up the model a 1" Rubber Ring 5 should be stretched between the Bolts 1½" apart at the top of the body to prevent the superstructure rotating of its own accord.

Parts required to build model Windmill: 2 of No. 1; 6 of No. 2; 9 of No. 5; 5 of No. 10; 1 of No. 11; 5 of No. 12; 2 of No. 15b; 1 of No. 17; 1 of No. 18a; 3 of No. 22; 1 of No. 24; 2 of No. 35; 56 of No. 37a; 50 of No. 37b; 4 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 4 of No. 90a; 5 of No. 111c; 1 of No. 125; 2 of No. 126; 1 of No. 126a; 1 of No. 155a; 1 of No. 186; 1 of No. 187; 2 of No. 188; 2 of No. 189; 2 of No. 191; 2 of No. 199; 2 of No. 200; 1 of No. 212; 1 of No. 213; 2 of No. 214; 4 of No. 215; 2 of No. 217a; 1 of No. 217b; 1 *Magic* Motor (not in Outfit).

The model goods van shown in Fig. 2 is commenced by building the chassis. Two 12½" Angle Girders 1 are bolted together to form a channel girder and two of these are attached at each end to 5½" Angle Girders. Two 12½" Angle Girders 3 are fixed to each Channel Girder.

The built-up axle-boxes are plainly shown in our illustration, and they are fitted by 2½" Strips 4 to the Girders 1. The dummy suspension springs are 3½" and 2½" Strips bolted to 1" × ½" Angle Brackets attached to the Girders 1.

The brake lever is a 1½" Strip 5 bolted to a 4½" Strip, to the lower end of which a Crank is attached. The Crank is fixed by a Pivot Bolt to a Coupling 6 to which two 2½" Strips forming the brake shoes are fitted, 2" Strips forming the links with Girders 1. Each lever is locked by a Bolt fixed to the 4½" Strip engaging one of the holes in a 2½" × ½" Double Angle Strip 7.

The floor of the wagon consists of three 12½" Strip Plates overlapped.

Front and back of the van are now fitted, the sides being attached by 12½" Angle Girders 8, and 5½" Strips, including those at 2, are bolted to the sides. The sliding doors are fitted as shown, a ½" loose Pulley being lock-nutted to the lower edge of the door. Each lock consists of a Hinge bolted to the side of the wagon and to a ½" × ½" Angle Bracket. The shank of a Bolt fixed to the Angle Bracket engages one of the holes in the door.

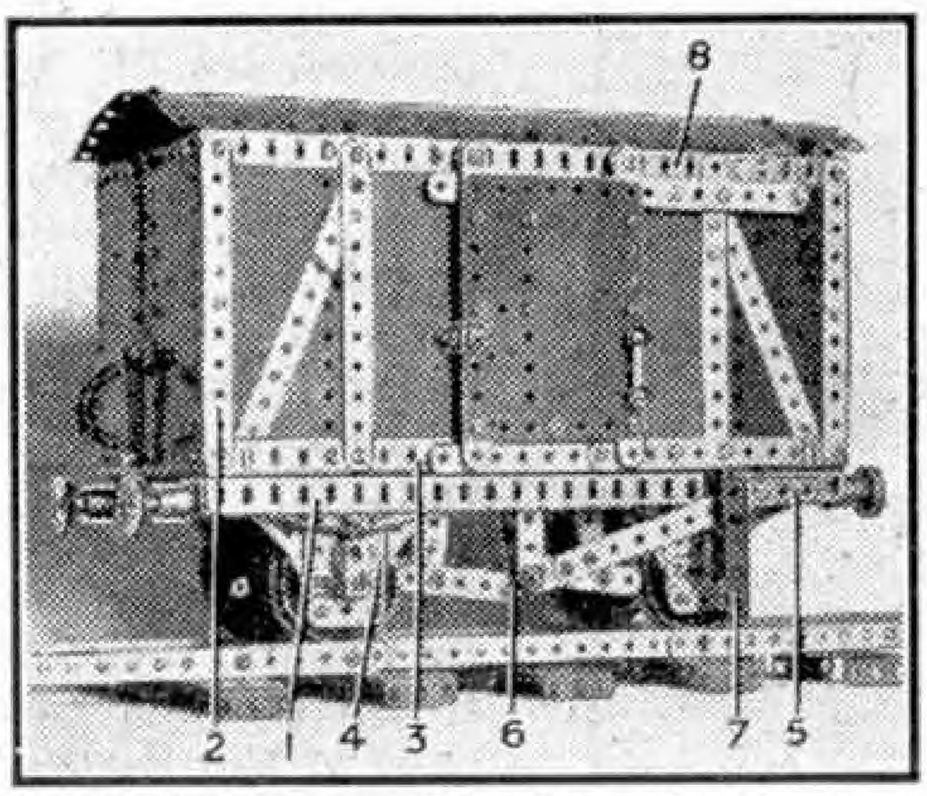


Fig. 2. A fine model railway goods van.

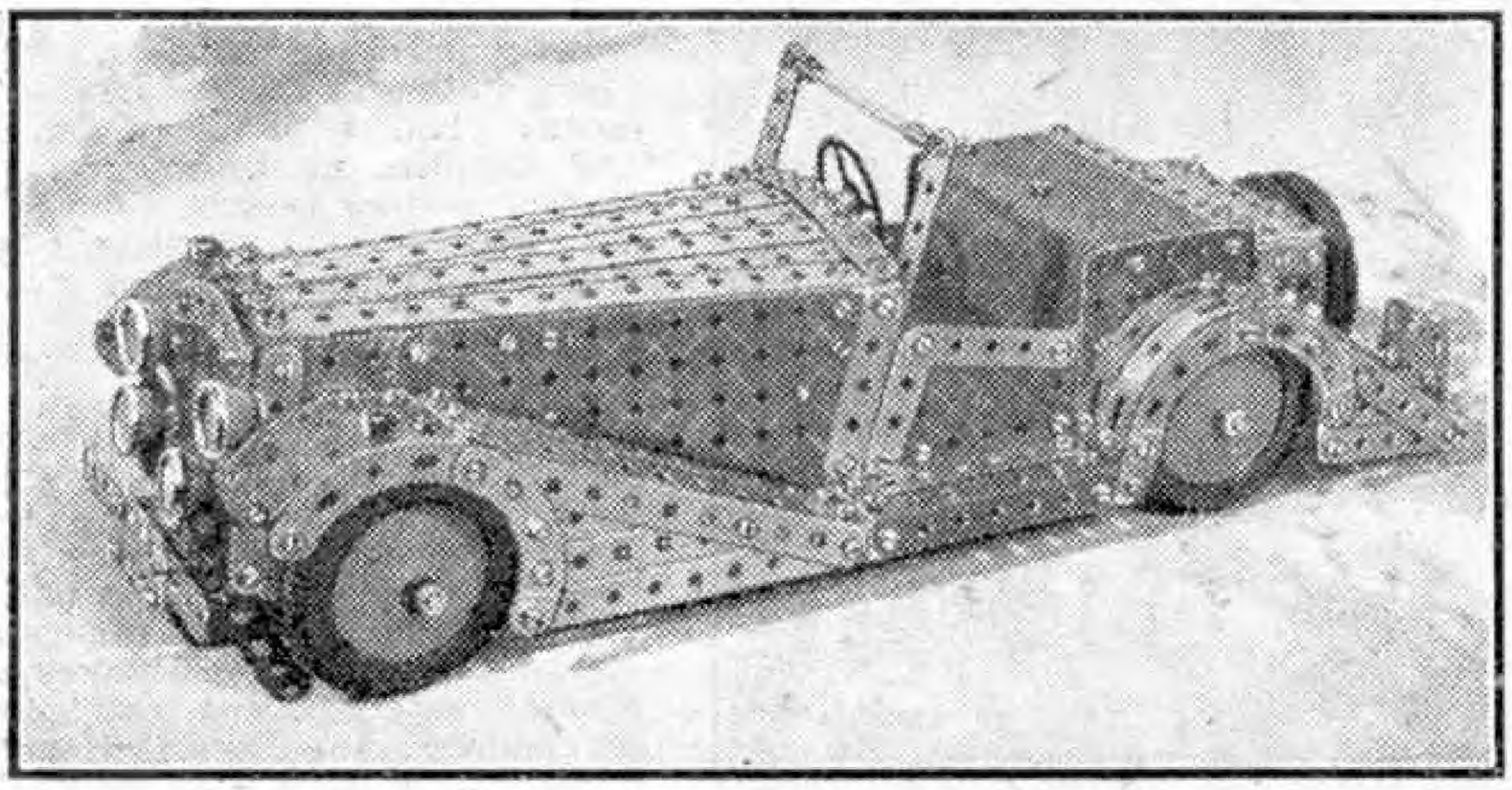
Parts required to build model Railway Goods Van: 2 of No. 1b; 16 of No. 2; 4 of No. 2a; 6 of No. 3; 16 of No. 5; 6 of No. 6; 10 of No. 6a; 8 of No. 8; 6 of No. 9; 14 of No. 10; 2 of No. 12; 4 of No. 12b; 6 of No. 12c; 2 of No. 15; 2 of No. 17; 4 of No. 18a; 2 of No. 18b; 4 of No. 22; 6 of No. 23; 188 of No. 37a; 166 of No. 37b; 36 of No. 38; 2 of No. 43; 4 of No. 45; 2 of No. 48a; 10 of No. 59; 2 of No. 62; 2 of No. 63; 8 of No. 90; 4 of No. 109; 14 of No. 111c; 2 of No. 114; 6 of No. 136; 4 of No. 137; 2 of No. 147b; 4 of No. 164; 5 of No. 188; 3 of No. 189; 2 of No. 191; 12 of No. 192; 6 of No. 197; 4 of No. 217b.

Meccano Model-Building Competitions

By "Spanner"

Our Simplicity Contest

Those who have not yet built models for entry in the Simplicity Contest announced last month have plenty of time to do so, as the closing date is 30th June. For this elaborate models are not required. The aim is to design a small model that can be built with comparatively few parts, and the simpler this is the better, provided that it is realistic and well constructed. A group of models can be submitted if desired, but no single entrant can win more than one prize in this competition.



This excellent representation of a two-seater sports car won a prize for E. Rusted, Nuneaton, in our 1943 New Year Contest.

This contest gives a special opportunity to model-builders who cannot obtain films or otherwise have difficulty in securing good photographs of their entries. Simple models lend themselves readily to representation by means of drawings showing general appearance and construction, and when ready these, together with any notes that may be necessary, should be sent to *"Simplicity Model-Building Contest, Meccano Limited, Binns Road, Liverpool 13,"* taking care to give name, age and full address. Photographs of course can be submitted if there is no difficulty in taking them, but competitors must not send in the actual models.

Entries will be divided into two sections, A for competitors over 15 years of age, and B for those under 15. In each prizes of £2/2/–, £1/1/– and 10/6 respectively will be awarded, and to encourage model-builders to submit entries we are awarding many consolation prizes for other good efforts. Closing date: 30th June.

"New Year" Contest Results

The prize-winners in our 1943 "New Year" Contest, first announced in our January issue are as follows:

1st Prize, Cheque for £2/2/–: L. R. Dougal, London S.W.20; 2nd Prize, Cheque for £1/1/–: J. Matthews, Fillongley; 3rd Prize: Postal Order for 10/6: E. Rusted, Nuneaton. Postal Orders for 5/–: N. C. Ta'Bois, Woodford Green; A. Wilson, Luton; C. Burney, Addlestone; S. Reid, Aberdeen; J. Kennett, Gerrard's Cross.

An outstandingly artistic bracket or wall clock was awarded First Prize for L. R. Dougal, West Wimbledon. It is driven by means of suspended weights wound up with the aid of a key that is screwed on the projecting threaded end of the winding shaft at the front of the model. The clock chimes the hours and half-hours, and auxiliary mechanisms have been incorporated to indicate the date and day of the week, and the phases of the moon. Even all these movements failed to satisfy their designer's ambitions, so he fitted an alarm that is set by adjusting an indicating dial at one side of the clock. Such a model as this would have been incomplete without a figure that pops out from the front of the clock at set times! In this case the figure emerges from the door of a cubby hole above the face at mid-day, only of course to be withdrawn again almost immediately. This fascinating mechanism is operated electrically through two magnets, one permanent and the other an electro-magnet.

J. Matthews, Fillongley, was awarded Second Prize for a well-designed horizontal engine model, in which careful attention has been paid even to minor details. A very effective suggestion of sturdy construction is given by the use of Flexible Plates to form the cylinder, which is attached by Flat Plates to the base. The flywheel is formed from two Ring Frames and is unobtrusively mounted in a pit in the base. The bearings for the flywheel shaft are readily accessible by steps arranged on each side of the pit and these are fitted with protective guards and handrails.

The illustration on this page shows a realistic model of a two-seater sports car, a fine effort for which E. Rusted, Nuneaton, was awarded Third Prize. The remarkably simple yet clean lines of this model can be realised from our photograph.

A compact railway breakdown crane earned a Consolation Prize for C. S. Burney, Addlestone. It is operated by an E6 or E20b Electric Motor that is accommodated, together with the mechanism required for travelling, slewing, luffing and hoisting, on a swivelling superstructure measuring only 8½ in. by 2½ in. An interesting feature of all these movements is that they are operated through clutches on the shafts in the gear-box. A peculiar type of pick-up to convey current from the collector shoe to the Motor is worthy of note; it consists of a length of bared wire passed around ½ in. loose Pulleys mounted at the four corners of the chassis in insulated supports and attached to a spring loaded arm.

J. A. Kennett was awarded a Consolation Prize for original models of earth-moving equipment, and other notable entries included a London trolley bus built by N. C. Ta'Bois.

Club and Branch News

WITH THE SECRETARY

PHOTOGRAPHS DURING THE OUTDOOR SEASON

Photography should not be overlooked during summer excursions. I know that it is not easy to obtain films, but whenever possible this should be done, and so the Club photographer, or photographers if there are more than one, should be kept at work making a record of the outdoor season. One thing should not be forgotten. This is the taking of a good group photograph, either in the Club room or in some suitable outdoor position. I should like to see many more of these so that I can select the best for reproduction in the Magazine. Nothing gives more pleasure to the members of any Club than to see such a photograph of themselves on the Guild page, and Leaders should do their utmost to see that photographs of this kind are made available for their Clubs.

Mr. M. C. Hodder, Leader, with the Kent Rangers football team, one of the 10 associated with the Exeter M.C. and this season's Hodder Cup winners.

In the past I have often urged Leaders to encourage their members to submit models in "*M.M.*" contests, and those who have followed out this suggestion have been gratified by the success that their members have achieved. The same plan should be followed in connection with "*M.M.*" photographic contests, which give splendid opportunities for making good use of pictures taken during Club outings. All prizes are in cash, and success in a competition means that further equipment can be secured.

RECENTLY INCORPORATED BRANCHES

443. Preston No. 1—Mr. P. Slater, 12, Carnarvon Road, Preston.

444. Downhills Central School—Mr. D. Farge, 6, Clonmell Road, Tottenham, London N.17.

445. Moortown—Mr. G. Cohen, 18, Stainburn Avenue, Moortown, Leeds 7.

PROPOSED BRANCH

Swindon—Mr. K. B. Blackmore, 28, Oxford Road, Swindon, Wilts.

CLUB NOTES

Acton M.C.—The general features of the Club's new track have now been settled. A special display was made of a miniature railway mounted on a base-board. Films continue to provide attractive meetings. "*The Signal*," the Club's official Magazine, is produced by the printing department and is an attractive publication giving news of Club activities and reproducing extracts from letters of members now in the Forces, who are regularly in receipt of special gifts from the Serving Members Fund. Club roll: 13. *Secretary:* S. W. Simmons, 37, Derwentwater Road, Acton, London W.3.

Crosland Lodge M.C.—A Pie Supper, Aeroplane Spotters' Tests, General Knowledge Competitions and Football have made up a crowded and interesting programme. More tests are being arranged, among them a "Railway Quiz," and Rambles are being arranged for the open-air session. Club roll: 12. *Secretary:* D. Graham, 19, Moorside Avenue, Crosland Moor, Huddersfield.

SOUTH AFRICA

Malvern M.C.—Meetings continue to be attractive, and good work is being done in spite of the absence of officials and members in the Forces. A Christmas party was greatly enjoyed, and the usual special efforts were undertaken to provide entertainment and gifts for children in the Epworth Homes. Other efforts have been arranged to provide funds for sending comforts to serving members, and a special award is to be instituted in memory of those who have fallen in the war. Club roll: 23. H. A. Trent, P.O. Box 8, Cleveland, Johannesburg, South Africa.

BRANCH NEWS

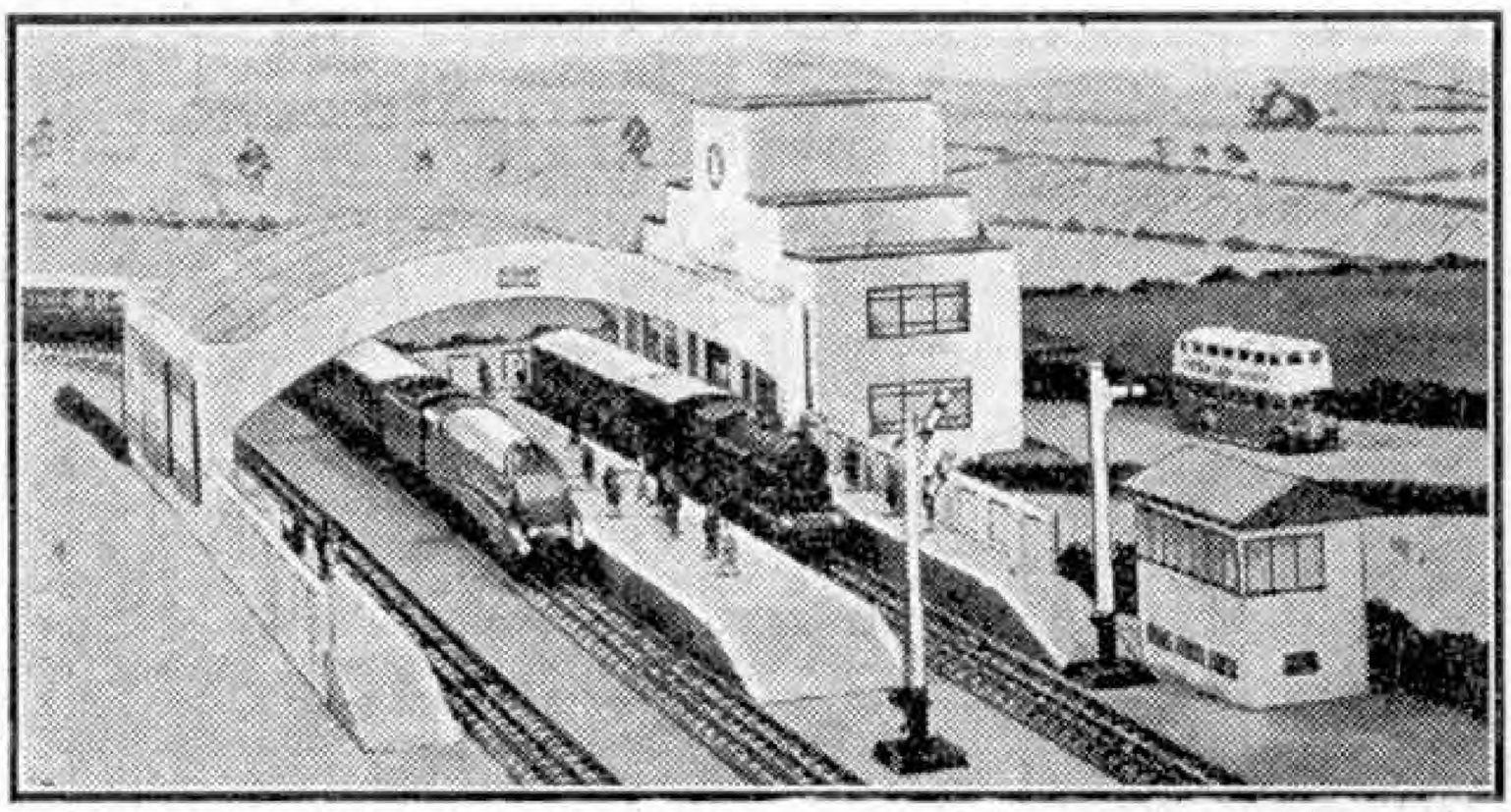
Burnley.—Track meetings continue to be held, with improved layouts. On one occasion single line working was carried out on a garden track, and interesting bus services were run. The Club's "mine" continues active; output is so great that a road service operated by Dinky Toys Lorries has been introduced to ease the strain on the railway. Plans are now being made for an Exhibition. *Secretary:* J. W. Barrett, 5, Brunel Street, Burnley.

Kingston-on-Thames.—On Track Nights realistic munition trains with suitable loads have been run, these including miniature tanks of wood and corrugated iron. A crane has been installed in the goods yard, and tunnels and platforms have been constructed and brought into use. Passenger trains also have been run and shunting operations carried out. *Secretary:* S. Matthews, 6, Cromwell Court, Kingston, Sussex.

Homeleigh (Wellington).—The Branch is making good progress. A new track of great interest has been constructed, and gives great enjoyment to both Senior and Junior members. A light repair depot has been established, and in this good use is made of salvaged material. A Stamp Section has been formed and a Meccano Model-building Section also is being established. *Secretary:* J. B. Pontefract, Homeleigh, Station Road, Wellington, Somerset.

More Fun in Dublo Train Running

IN these pages of the "*M.M.*" we have often remarked on the improvement in the general realism and the greater fun that results if train operations are carried out in an orderly and "connected" manner as opposed to the running of different trains "just anyhow." If an orderly or connected series of operations is followed, then the running of the trains and the work generally will more closely resemble real railway practice than is often the case.



"Dublo Junction; change for Binns Road." Note the branch line train waiting in the bay platform while the express runs in.

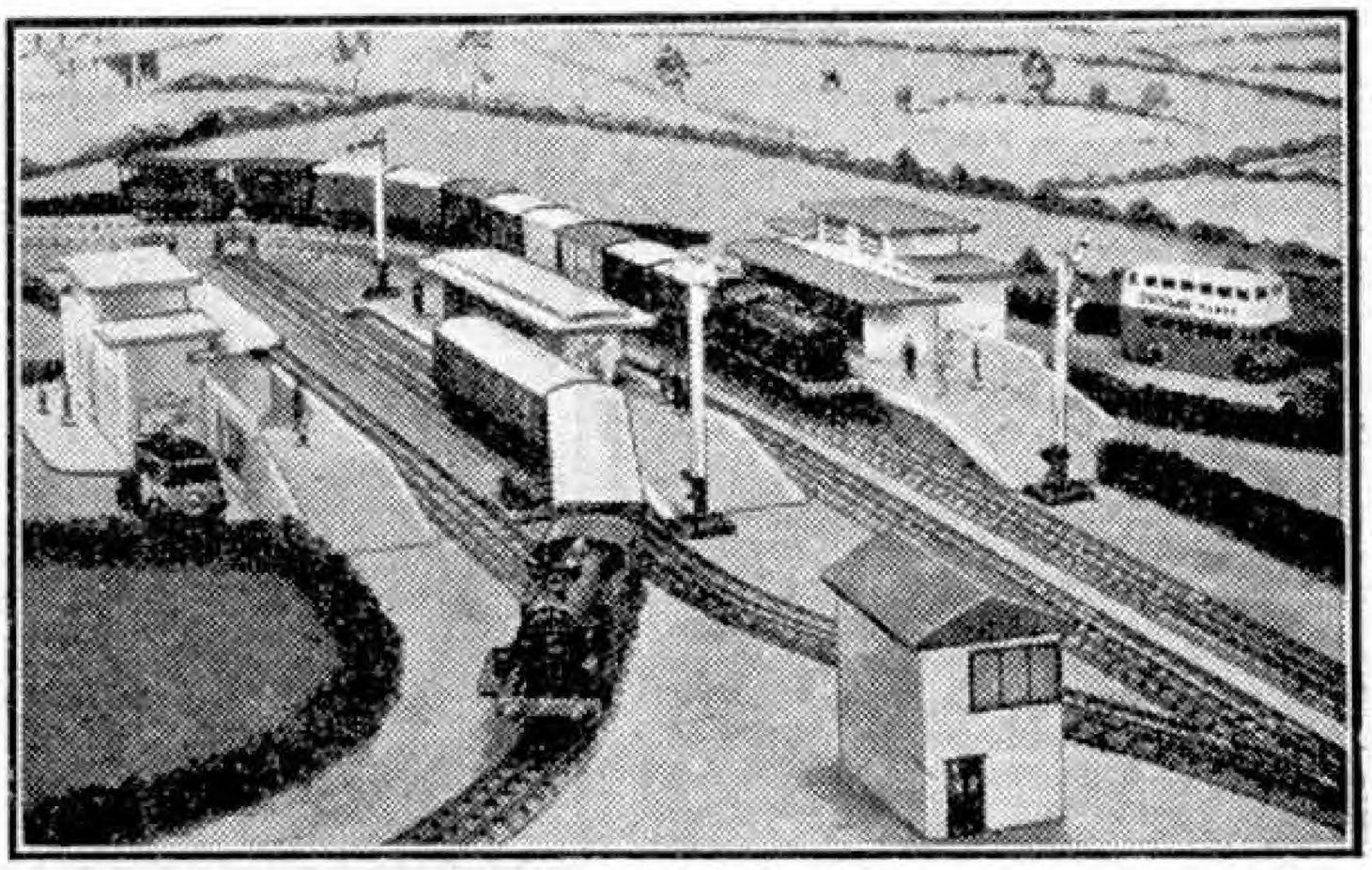
Similar considerations apply to the placing and use of accessories and other items on the line. Take the station for example. Many years ago we read a model railway story in which the miniature figures on the platform were supposed to speak, and they complained strongly that however long they waited no train ever stopped! This is still quite a common fault on many miniature railways, and one that is immediately noticed by the critical visitor. Having established a station, for we must have one at least, and having peopled it with miniature figures, we must give them a chance to use the trains that they are waiting for. This is where the scheme of having a definite plan of operation comes in.

On the average small layout with only one station the usual scheme for a "stopping at all stations" train is to make it halt at each circuit of the track. If this becomes monotonous, though it should not if we are really keen and work out the stops involved in some actual journey, then we can stop our train after different numbers of circuits. This presents no difficulty on an electrically-operated layout, for the speed control lever can be worked to give a brisk get-away from one stop, a brief "gallop" between stations, and then a smart but not too abrupt slowing down to the next halting place. If we have a clockwork line we must make a few experiments to find out how many turns of the key are necessary to take the engine from point to point with various loads. This involves a little trouble but the realistic results make it well worth while. As a rule it will be found that slightly less winding is required when the engine is re-starting than when it is making its first run. However, a few tests will soon show what the difference is, and we can make allowances accordingly when we are running a service.

Where a layout is large enough to have a junction type station there is often a small branch line. Quite frequently, however, we find that the branch line service is very haphazard, and is not made to connect with the main line trains at all. The ideal to aim at in planning operations is to have the branch line train arrive a little while before the main line train is due; it waits in order to afford a proper connection, and then when the main line train departs the branch line train can go off too.

Another branch of station working, whether a small halting place or a larger junction, concerns the signals. Points may have to be moved for certain operations, especially if any shunting on or off of vehicles is being carried out. Signals, however, are apt to be forgotten in the excitement of train movements; it is far more realistic to operate the signals correctly for a particular "episode" than to leave them merely as decorations. If they are electrically-operated the job is fascinating, but if they are hand-operated the station signals at least can be reached from the usual operating position. Other signals "out of reach" can be left in the charge of a "Junior Operator" who will work them under the directions of the "Chief Operating Manager," or whatever other official title the owner of the line assumes.

A further job that probably will appeal to junior assistants is the management of the road vehicles. Motor bus services can be made to connect with the trains, and there is also the fun of taxi running to bring imaginary "fares" to and from the station. Lorries and other vehicles can be worked in and out of the goods yard to connect with the freight services, and if operations on these lines are developed with care a great deal of additional fun and interest will be had.

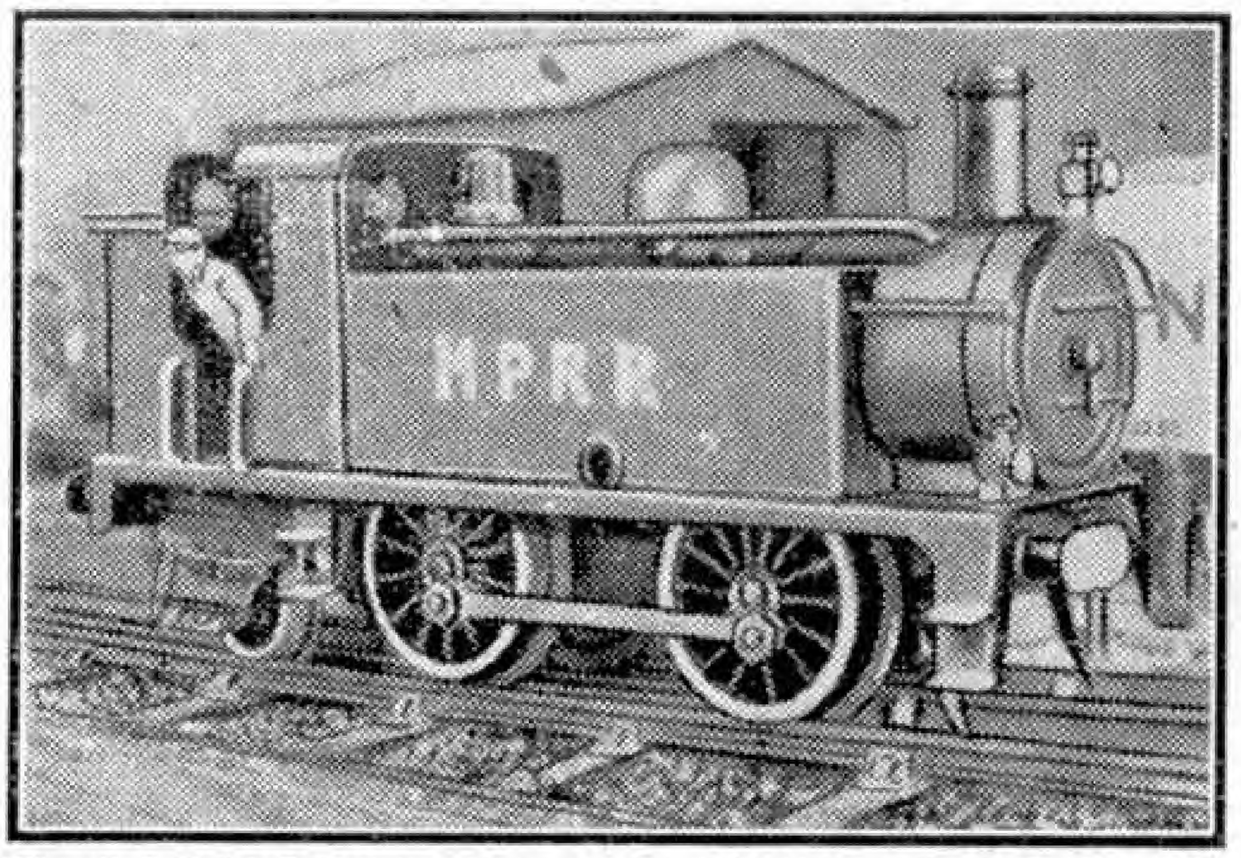


A branch line train leaving while a fast goods passes down the main line. Miniature figures and motor vehicles add to the realism of the scene.

The "Methuen Park Railroad"

A Layout in a Limited Space

THE illustrations on this and the following page are of an interesting system the official title of which is the "*Methuen Park Railroad.*" This is not based on American practice as the title might lead one to suppose at first but it is chosen because the owner, Mr. F. Appleton, of London N.W.1, prefers



The 0-4-2 tank locomotive of the "Methuen Park Railroad" described in this article. The engine was built by Mr. F. G. Appleton, the owner of the layout.

the term "railroad" which was frequently used in this country in the early days to describe what we nowadays invariably call a "railway."

Although the system as it is to-day was commenced only two and a half years ago as a distraction from wartime activities it had its origin in quite the earliest days of Hornby trains, and the first engine was one of the popular "Zulu" Tanks of those days. Even before that Mr. Appleton had been a "Meccano boy" for some years, so that he has had a considerable experience of the products of the well-known Factory in Binns Road! At that time of course clockwork engines only were the rule in the Hornby System, and the "Zulu" was later supplemented by various typical brass-domed Hornby locomotives of that time.

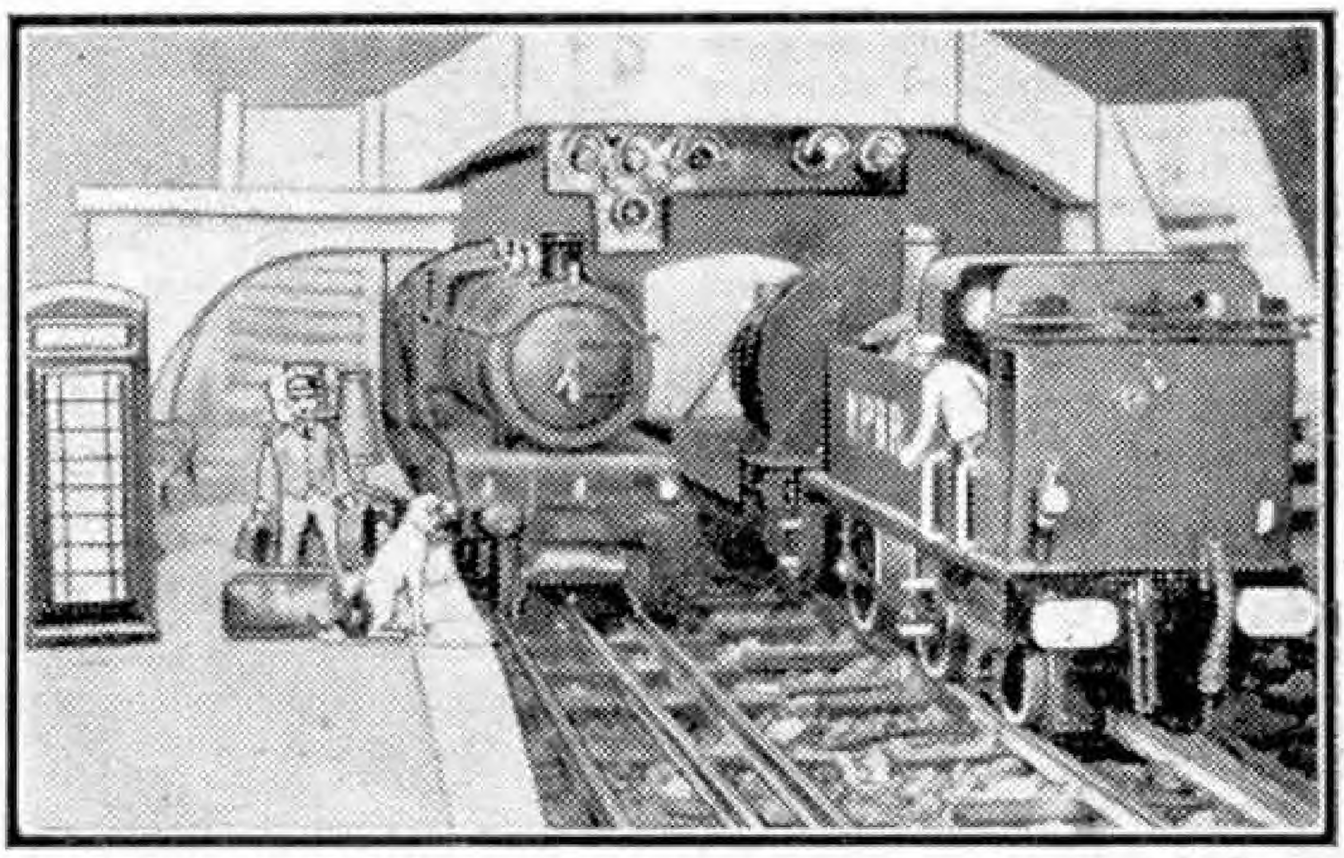
After some development, as in the case of quite a few model railways 20 years or so ago, the attractions of radio and then motor cycling ousted the railway and the original stock was disposed of. However, another start was made some six years ago and an electrically-operated miniature railway had reached a promising stage of development when it was abandoned because its operation was not appreciated by the tenants of the flat below! The trials of many miniature railway owners, especially in the larger gauges, are surely in proportion to the difficulties experienced by the promoters of real railways over 100 years ago!

So after a lapse of time the present layout was commenced, a removal in the meantime making matters more favourable in that a separate room became available, although this is of somewhat restricted dimensions. A space of 10 ft. by 6 ft. is not unduly large for a gauge 0 layout, so that the system has a definite "branch line" character, but is none the less interesting on that account. The line is laid on a raised structure 3 ft. high so that it is at a convenient height for handling. Boards 1 in. thick form the base so that a firm foundation for the track is assured.

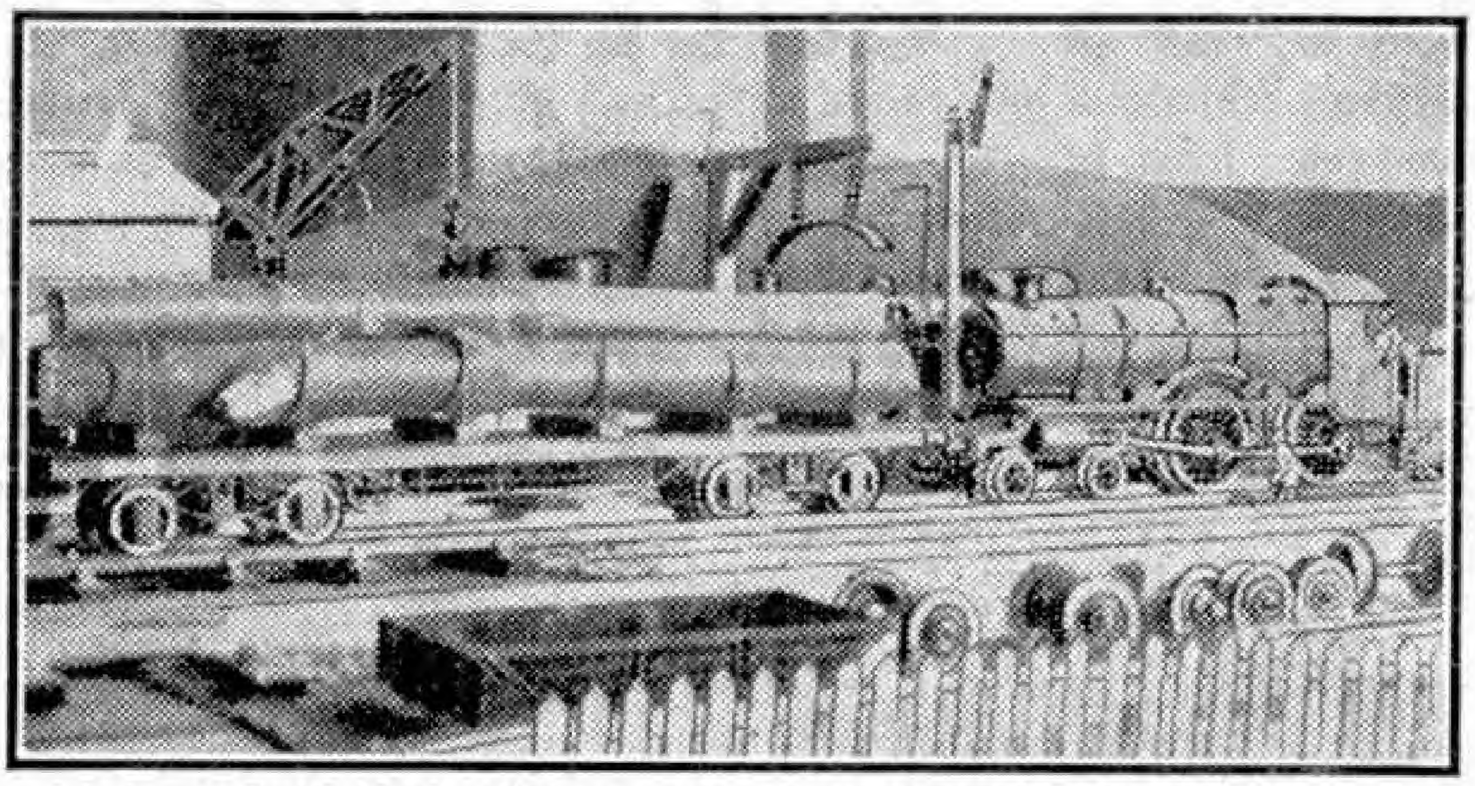
Naturally the layout is a simple one and only one station, named "*Methuen Halt,*" is included. This has a single platform and is situated alongside the single track main line which, having to make the most of the space available, is oval in form. In passing the station platform and its approaches the main line has a loop taken off it and by means of various points connections are made to sidings serving a goods platform and a small shed with Platform Crane and loading gauge at one end of the room. At the other end of the room it has been found possible to include a small locomotive shed, access to this being gained by means of a turntable. A water tower and two engine roads complete the "Locomotive Department." These features are all outside the main oval and are concentrated on one side of the system; along the opposite side the line runs through a long tunnel the main purpose of which is to carry the track past a desk and other items. Curiously enough, as is the usual way on model railways, any minor mishaps such as buffer-locking and so on that may occur invariably happen in this tunnel! Actually these occasions are infrequent, but to deal with them the top of the tunnel is made removable.

The track is composed of small scale permanent way material and is electrified, the current being 20 volts fed to the centre rail. The line is ballasted throughout with fine limestone chippings as obtainable from "bird shops" and it is merely laid in position, not glued or otherwise "fixed" as is sometimes done. As long as the ballast is kept "within bounds" by a wood strip alongside the track or by the presence of a miniature board fence or other scenic feature, the fact that it is not fixed to the baseboard is of advantage if there are alterations or repairs to be made to the track. Ballast spilled on the floor is however not popular with the Home Authorities as many readers may have found out.

Signalling has not progressed a great deal in extent but what there is has been well done. Two aspect colour-light signals are used, an accumulator being employed to supply the necessary current, so that



"Methuen Halt" showing the overbridge and light signals.



A home-built bogie timber wagon is included in this illustration.

the installation is on quite modern lines. The individual signals have all been constructed at home and are wired to contacts at the points so that the operation of the latter automatically changes the signal aspect. An interesting point is that there are several "dolls" or dwarf signals suspended from the footbridge that spans all tracks about half-way along the platform at "*Methuen Halt.*" This position gives them an unusual and realistic appearance, being a change from the more or less standard arrangement of having a cluster of signals on a gantry or bracket post structure.

The overbridge incidentally leads from the station platform over the lines to a car park that has recently been provided just outside the tracks. This we are told has been made specially for the convenience of regular passengers who live a fair way from the station. Most of them must do because so far there have been no "housing developments" in the neighbourhood, although a notable lineside feature is a miniature "Tudor Cottage" with leaded windows. This is a most effective piece of scenery that was built at home and its charm is increased by the fact that it can be lit up when required; naturally it has a most attractive appearance. Electric lighting is also provided in the station yard and elsewhere by means of lamp standards. There is in fact enough illumination on the railway itself to make night operations possible in a realistic manner, the light in the room being then turned out.

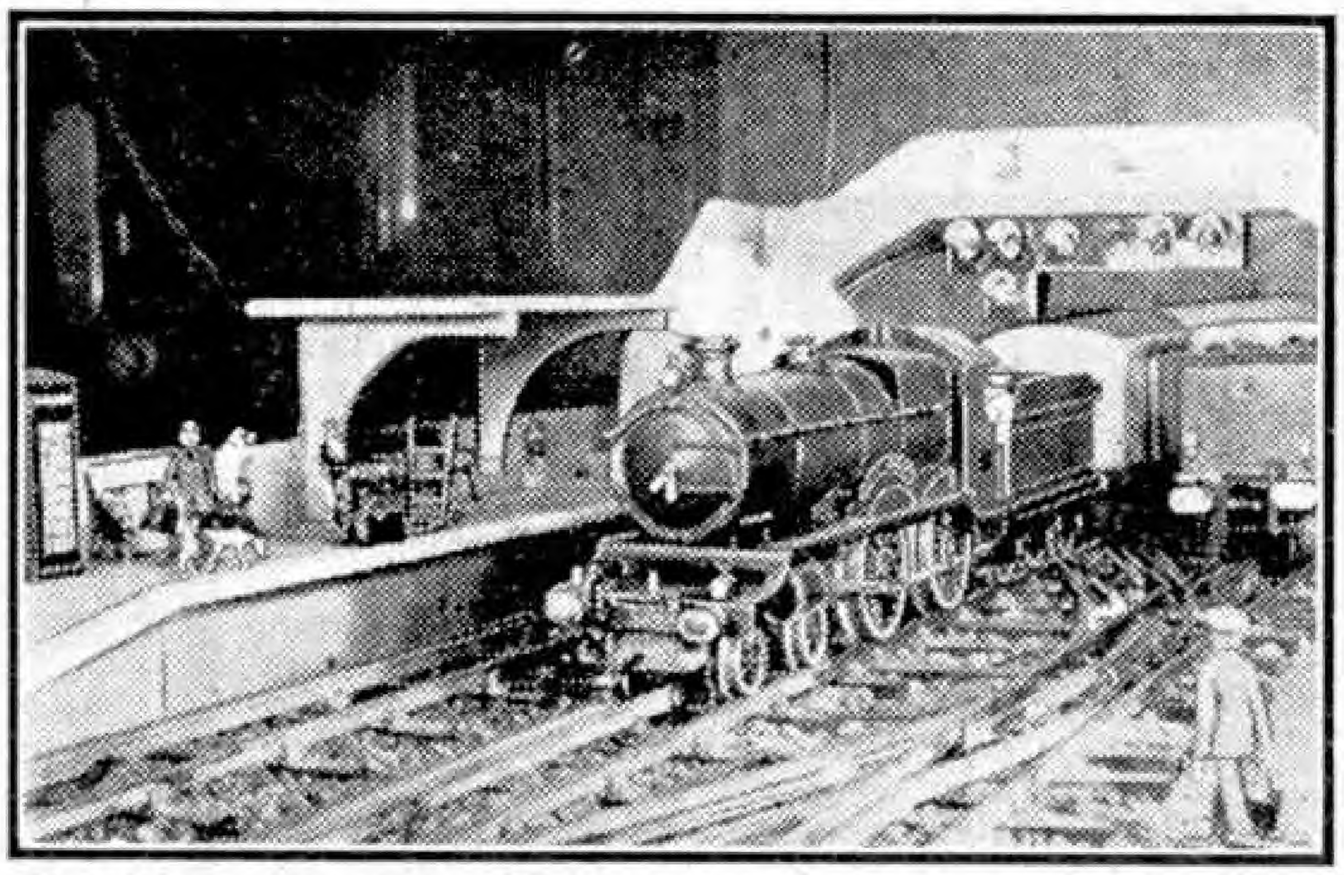
The district served by the line is "country" in character, but it is slowly being developed so that increased passenger and goods traffic is to be expected. Actually goods developments, as measured by the recent increases to the "Company's" freight stock, have made necessary an extra siding, and this meant lengthening the station footbridge, so that altogether it was quite an involved job.

Lineside items in the neighbourhood of the station include a fogman's hut, and there is a signal cabin so placed that the "box-man," to use a railway term, has a good view of the whole of the operations carried out at the station and in the adjacent sidings. Miniature figures add a realistic touch to the platform and railway premises generally, and local milk traffic is well catered for by a number of platform trolleys and a "regiment" of churns. Hornby Hedging and Trees add a welcome touch of green to the surroundings. The car park at the station usually accommodates a fair number of Dinky Toys Motor Cars; other street features include "A.A." and "R.A.C." call-boxes and there are in addition G.P.O. letter and telephone boxes. In the goods yard freight items include Cable Drums and Miniature Containers and various other loads, all of which are handled by means of the Platform Crane referred to previously.

The rolling stock is not numerous as yet, but no doubt as traffic grows there will be greater activity in the "Company's shops." A prominent vehicle in passenger traffic operations is a bogie Hornby Pullman. In addition to its normal use it is employed at periods of slack traffic as part of a "pull and push" train which makes an ideal unit for typical branch or local work. Among the freight wagons are several from the Hornby range, including various special-purpose vehicles, such as a Cement Wagon, and a "United Dairies" Milk Tank for through milk traffic in bulk. Each of these has had additional details put on. Home-built items include a goods brake of the pattern used on the former G.N.R. and a very effective bogie wagon, or "*Macaw*" as the G.W.R. code would describe it, for timber traffic and other long loads.

The locomotive stock is varied, pride of place being taken by a Hornby G.W.R. "*County of Bedford*" Locomotive. This has had certain additional details put on by the owner of the layout, including a dummy crosshead-driven vacuum pump, reversing rod from the cab to a point ahead of the front splasher, brackets for spare lamps, and so on. This engine has the reputation of being a most reliable performer. Another locomotive, built at home, is what may be described as a 0–4–4 version of the well-known L.N.E.R. "N2" class tanks. These of course have the 0–6–2 wheel arrangement, but the model follows their general lines and details, including the condensing pipes and the flat-roofed cab with rounded "eaves."

The "works" of the third engine, a 0–4–2 tank, are nearly 20 years old, and survive from one of the old Hornby No. 2 Locomotives! Bearings are worn but the mechanism, which is of course a clockwork one, still works well and the engine has a fine turn of speed.



A freight train passing "Methuen Halt," with the Hornby "County of Bedford" at its head.

On this system very realistic results have been attained by concentrating attention on a single station, with its yard, goods depot and so on. Where a good length is available but not much width, a "station" system instead of a "main line" system can provide a great deal of fun. A "layout on a shelf" more or less, has distinct possibilities, and we hope to go into the idea more fully at some future date.

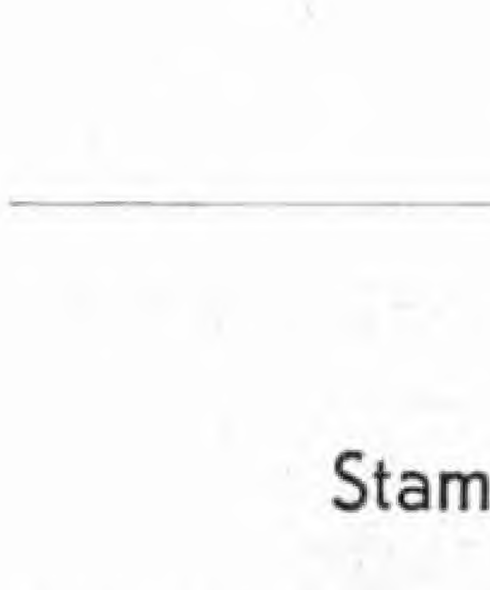
For other Stamp Advertisements see pages 212 and v.

Stamp Collecting

Stamps of the Free Countries. No. 3 Bolivia

By F. E. Metcalfe

EXACTLY 34 countries have to date declared war against the Axis powers, and the latest of our allies is Bolivia, "*Buen venida*" as an inhabitant of that country might say. Well enough known to many stamp collectors, no doubt, but it cannot be claimed that the public at large have a very thorough knowledge of this far away republic. It is perhaps just about on a par with the average Boliviano's knowledge of us, as the writer of this can testify from one of his own experiences. He was sitting in an hotel in La Paz explaining to the owner of a large country store that he came from Inglaterra. "*Inglaterra, yes I've heard of that country. Why, it's the other side of Buenos Aires,*" said the store owner.



Of course Bolivia is not a large country as they go in South America, with its area of just over half a million square miles; moreover it suffers a great handicap in having no coast line of its own, and its population is a bare three million of Indians and people of mixed blood. Yet it has a valuable economic importance to its allies, if only for its production of tin, which even in peace time equalled about a quarter of the world's entire output. With our Eastern tin mines in the hands of the Japanese, and thus for the time being out of reach, it can readily be understood how glad we are to welcome Bolivia into the ranks of the Free Nations.

Of course tin is not the only contribution Bolivia can and is making to the war larder, for apart from Chichona bark, for conversion into quinine, her production of rubber and copper is substantial; so no doubt the authorities, far from saying where is Bolivia, are saying let's have a few more allies like her.

Since she became a republic in 1825, largely owing to the efforts of that great soldier Simon Bolivar, Bolivia has not had a particularly peaceful existence. Internal as well as external strife has many times almost ravished the country. Even the youngest of us will remember its recent clash with Paraguay, so its inhabitants must hope that this latest venture will be the last of its kind for a long time.

Actually Bolivia is a fascinating country and lots could be written about it; however, it is its stamps which are our chief concern, and if we don't get on to our subject, our space will soon be used up.

Like all South American republics Bolivia has in latter years become very stamp conscious. Whereas during the first 50 years of its philatelic history it only issued about 140 stamps, it has since then, in about 30 years, produced over 260 different varieties, and it is still going strong, for we recently illustrated one of a set of seven which had just been emitted to commemorate the first Scholar's Philatelic Exhibition at La Paz.

Bolivia's first stamps appeared in 1866, and these have become known to Collectors as "Condors," owing to the incorporation in the centre of the design of a crude engraving of that most mighty of all birds, the condor of the Andes, a bird naturally well known to the inhabitants of Bolivia.

Actually it is a fascinating issue, with its many shades and retouches, and unlike most first issues a quite representative lot can be got together at a fairly low cost, that is if the stamps can be found. Alas, this is another issue of stamps which is popular with those collectors who were there first. You know them; those who after carefully locking up all they can lay their hands on, adjure us to "Leave the 'pretty-pretties' alone, my boy: just you collect the fine old classics," omitting to mention of course that long since they had cornered anything in fine condition.

Stamps issued in Bolivia from 1868 to 1893 are not particularly attractive, though many interesting postmarks are to be found on some of them.

The next issue, that of 1895, has been rather spoiled for the junior collector, for those which come his way are mostly fakes. They are not hard to distinguish, but as one collector remarked one day, when we pointed out the difference between good and bad, "What's the good of knowing the right ones, when they never turn up?"

We confess a liking for the issue of 1897 and not the least of its virtues is that it was produced, as was the first issue, in Bolivia itself. Whilst Bolivia has printed a lot of its own stamps it has also gone to U.S.A. and England for certain issues, and whereas these latter stamps are no doubt technically and perhaps artistically superior to those produced in Bolivia, they lack that something which is typical of that rather romantic country itself.

We recently saw a collection of Bolivian stamps issued before 1913, and an awfully attractive collection it was too, but stamps issued after that date will make a still more attractive show. A good showing can be got together at little cost, for whereas Bolivia has in latter years turned out many stamps, there have been no artificial restrictions, and most of them are still quite cheap and easily obtainable, for they are not fashionable amongst the old collectors with the long pockets.

For other Stamp Advertisements see pages 210 and v.

Stamp Gossip
and Notes on New Issues

There is a catalogue as well as stamps to talk about this month, for Messrs. Stanley Gibbons Ltd. have brought out a new edition of the "Simplified." Of course what most collectors really want is a new "Whole World," and they cannot help looking longingly overseas to U.S.A., France and Switzerland, thinking how lucky collectors there are in getting their yearly complete catalogues as usual. As a matter of fact collectors in the U.S.A. are better off than ever, for Scott's catalogue for 1943 is bigger and better than it was in peace time, which shows what can be done.

But collectors at home look like waiting a good bit longer before the "Big Gibbons" appears again; that being so one can only hope that the next edition will have been thoroughly overhauled. There will have been plenty of time for the operation at any rate, and few will question the necessity, in view of the modern trend of philately.

The price of the new "Simplified" has been very wisely kept at 10/- a copy; moreover, instead of a proportion being taken up by offers of sets, etc. the whole of the catalogue has been used for illustrating and listing stamps. This is as it should be, for that is precisely what buyers expect when they put down what is not, after all, an unsubstantial sum, which very few would expend were catalogues merely dealer's price lists.

Junior collectors will find the new "Simplified" quite useful, but many of the prices are out of date already, and whereas lots of dealers would gladly sell hundreds of stamps at a third or less of their catalogue quotation, they would on the other hand just as gladly pay twice as much as some of the prices. Nay, the writer of this would jump at the opportunity of buying more than one stamp at 10 times catalogue price.

But enough of catalogues. What about new stamps? Well there are plenty to engage our attention this month, though we can only touch on a few of them. Perhaps the most important is the use of a new die, or the old one heavily retouched, for the latest printing of the whole set of Mauritius stamps. There was a white patch under the king's eye on the old die, but this has disappeared in the new printing, for the patch has been lined in like the rest of the face; moreover, most of the other face lines have been strengthened, and in some cases carried nearer the profile, thus altering considerably the general expression.

As these stamps are not "Old Classics," when a dot or a dash or even faulty perforation is sufficient to earn a place, there may be some reluctance about adding the new printing to the catalogue. But who should worry about this, for they are well worth a place, which means that collectors of Mauritius will want to include them in their collections, and that after all is the main essential. If editors of established catalogues will not cater for all classes of collectors, those who collect the old, as well as the new, it will be just too bad, in the long run, for the catalogues.

Readers will have noticed in the newspapers that Vichy inspired stamps have been removed from Algerian post offices, but not many will have had a chance to see any of these stamps, so we are illustrating one. The stamps themselves are attractive enough, even if the subject of the portrait is not.

South Africa has now completed the set of "Bantams" and many collectors have not yet made up their minds just how to collect this set. We for our part are being satisfied with horizontal strips of three of the ½d. and 1d., vertical strips of three of the 3d. and 4d., horizontal pairs of the 1½d., 2d. and 6d., and a vertical pair of the 1/- value. Of course specialists in South African stamps will have to have just double these quantities, except in the case of the 1/- values, to have all perforation varieties, but the stamps make an attractive show, mounted either way. Incidentally the ½d. value has now appeared in two shades, as happened in the first issue of war stamps, and both are quite distinct. The first was blue green, and the latest is yellow green.

Besides the "Bantams" South Africa has brought out a new 1/3 air stamp, printed in olive-brown, with inscriptions alternatively in English and Africaans, and these stamps have already been overprinted for use in South West Africa.

Peru has also issued a new set, and this one is to commemorate the 400th anniversary of the discovery of the mighty Amazon, and what a mighty river it truly is. The writer has more than once passed its mouth, whilst well over 100 miles out to sea, yet the water was the dirty green of the river itself. It was as a matter of fact river water, such is the volume poured into the Atlantic Ocean.

The stamps have been rather poorly produced by the Colombian Bank Note Company, yet they are not without interest, and the designs at any rate are good.

Italy is apparently doing all it can to bolster up its morale, and even stamps have been called in to help, as can be seen from the stamp we are illustrating. Poor Italy. Its heart never was in this war, and it will take more than stamps to supply the incentive.

The latest news we have about the recently issued 1½d. stamp of Australia, to which we referred on Page 177, is that it is *not* to be changed in the near future.

We have just been able to examine the latest printing of St. Kitts-Nevis stamps, and find that all those bi-coloured, that is the 2d., 3d., 6d., 1/-, 2/6 and 5/- values, differ considerably from previous printings.

For the first time the 6d. and 1/- values appear on paper used previously for the 2d. and 3d. stamps, but strangely enough the 2d. has reverted to thin paper. Shades differ slightly and the perforation of the large stamps is now that of the small ones, viz. perf. 14, so it all means more work for the catalogue editor.

New Electric Shunting Locomotives—

(*Continued from page 182*)

of the locomotive is the height of the trolley wire; this comes down to a minimum of 8 ft. above the rail. It was accordingly necessary to place the driver's cabin at the end and to bucket it by cutting away the locomotive frames, thus allowing of low side entrance.

These locomotives operate on a two-mile siding, each handling a train of 30 tubs which total about 65 tons. With this load a speed of 8 m.p.h. is obtained on the level and 6 m.p.h. up the maximum gradient of 1 in 48. The maximum speed is limited to 14 m.p.h.

This description is reproduced from "The Metropolitan-Vickers Gazette" by courtesy of the Editor.

Forty-Five Years of Railway Photography—

(*Continued from page 185*)

I then purchased a Goerz "Dagor" working at F6.8, and with this combination I turned out some of my first really passable work.

It was shortly after acquiring this set that I was at York, and took the opportunity to have a shot at the up "*Newcastle-Sheffield Flier*," then the fastest timed train in the kingdom, with its scheduled speed of over 61 m.p.h. from Darlington to York. Having pitched the tripod on a suitable spot on the low embankment, I proceeded to focus, of course with a cloth, when I became aware of a confused buzzing sound at my feet, and on glancing down was horrified to find myself absolutely surrounded by wasps. I had pitched that tripod right on top of a thickly populated wasps' nest, and the inhabitants were showing their not unnatural resentment in no uncertain fashion. Well, I seized the cloth and made tracks along that rough and sloping embankment at a pace which put the "*Newcastle Flier*" right in the shade! By wielding the cloth furiously I managed to escape without a single sting, but it was only the imminence of the time at which I expected the "*Newcastle Flier*" which gave me sufficient courage to retrieve my apparatus, and you may be sure I wasted no time in getting away again.

I should like to make it quite clear that I do not wish in any way to discourage any young enthusiast who has perforce to make use of a camera not fitted with a focal plane shutter and large aperture lens. My own experience and that of many others (such experience having been bought with many years of experimenting, plus much waste of material), is that, provided one is prepared to recognise, and make allowance for, the limitations of such an outfit, it is possible to turn out quite passable work. The main point to bear in mind must always be that the ordinary front lens shutter, as fitted to such cameras, is quite useless for trains at high speed, and even were it sufficiently fast, no lens with a smaller aperture than F6 would give sufficient exposure with a higher shutter speed than about 1/200 sec.

There are, however, many large stations having an overbridge in the very near vicinity, and if one does not object to a high viewpoint, quite good results can be obtained from such as the trains will not only be travelling quite slowly but will also usually give very impressive exhaust effects. An exposure of about 1/50 sec. will generally be ample, in sunshine. There are also many heavy gradients throughout the country on which trains frequently drop to as slow a speed as 30 m.p.h., and these furnish quite fair game for such an apparatus.

In addition to this, many opportunities for shots will occur from station platforms, such as engines standing at adjoining platforms, or coaling and watering in yards, which are often situated within reach of a platform. If one makes such a camera a constant travelling companion it will be found that it is quite possible to form quite a comprehensive collection.

The three illustrations are all from negatives made by the "Cyclist's Gem" camera referred to on page 185, and will, I think, bear out my statement that trains at speed were quite a feasible proposition, in a good light and with the quickest exposure available.

EDITOR'S NOTE—Readers should bear in mind that this article refers to peace-time railway photography, and that such work is practically impossible under present restrictions.

(*Next month: "My two Reflex cameras"*).

The Diesel Engine Locomotive—

(*Continued from page 191*)

working, together with a further indirect saving of approximately £180, making a total saving of £910 in 12 months.

The upper illustration on page 191 shows a number of Diesel engines for locomotives at various stages of construction in the shops of a well-known British manufacturer. These are eight-cylinder single-acting 2-cycle engines developing 300 b.h.p. at 1,200 r.p.m. They weigh 2.16 tons each, have frames of welded steel construction, and an overall length of 7 ft. 4 in.

All Diesel engines are, of course, thoroughly tested before leaving the manufacturer's works, and the last illustration on page 191 shows one such engine coupled up to a dynamometer on the test bed. This particular engine is for a 170 b.h.p. 0–6–0 shunting locomotive ordered by the L.M.S. railway.

(*Next Month: "From Power Unit to Driving Wheels"*).

William Hedley—(*Continued from page 195*)

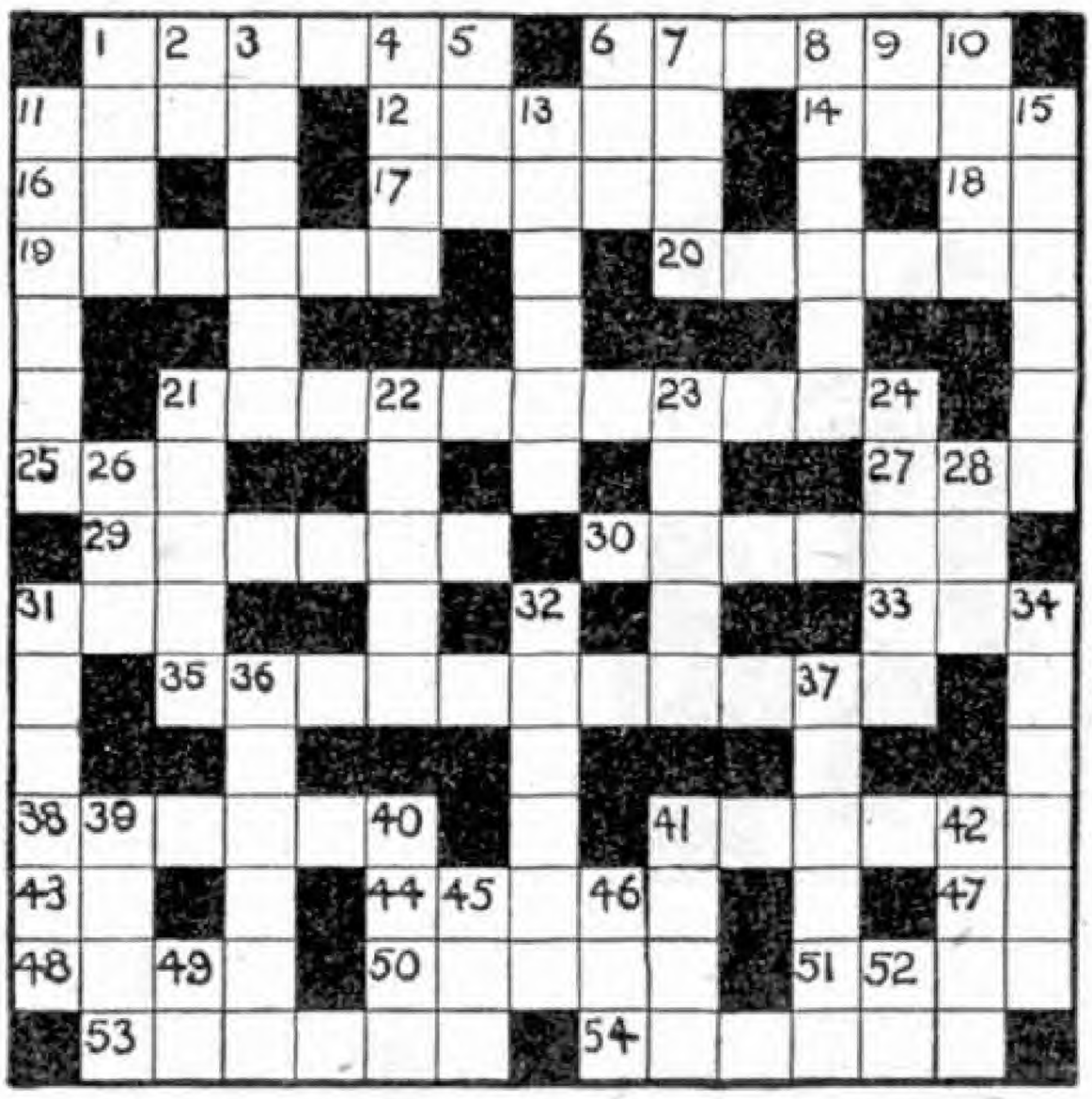
and the staithes. After the strike the keel thus equipped was used for some years in towing ships.

After leaving Wylam, about 1826, Hedley took over various collieries and devoted himself to developing them and increasing their efficiency. At Callerton colliery he introduced improvements in the pumping machinery.

Hedley died at Burnhopeside Hall, near Lanchester, Durham, on 9th January 1843.

Competitions! Open To All Readers

Try this Easy Crossword Puzzle



CLUES ACROSS:

1 Worshipper (6). 6 Thin (6). 11 Tumult (4). 12 A finger's breadth (5). 14 Asiatic country (4). 16 Short for 31 down (2). 17 Final stage of insect life (6). 18 Prefix (2). 19 Agreement (6). 20 Of the sea (6). 21 Kill by secret assault (11). 25 Negative (3). 27 Denial (3). 29 Changes (6). 30 Cask (6). 31 A period (3). 33 Domestic animal's cry. 35 Thoroughly confused (11). 38 Named (6). 41 Rustic saddle (6). 43 Domestic animal (2). 44 Cleanse with liquid (3). 47 Veterinary surgeon (abb.) (2). 48 Skin (4). 50 Amphibious animal (5). 51 Send out (4). 53 Vagabonds (5). 54 Underground passage (6).

CLUES DOWN

1 Helps (4). 2 Perform (2). 3 Remaining things (6). 4 Prepare for publication (4). 5 Edge (3). 6 Artificial covering of hair (3). 7 Particle (4). 8 Spirit (6). 9 Only part of 5 down (2). 10 Spun Wool (4). 11 Explanation (6). 13 Showy (6). 15 Mildly (6). 21 Volume of maps (5). 22 Judgment (5). 23 Organisation for Services (5). 24 Foe (5). 26 Used in rowing (5). 28 Drink (3). 31 Conducts newspaper or Magazine (6). 32 To mourn (6). 34 As long as (6). 36 Large fleet of armed ships (6). 37 Appropriate to Lent (6). 39 Departure (4). 40 Descend (4). 41 South American country (4). 42 Bad (4). 45 Belonging to it (3). 46 To put (3). 49 North Riding (abb.) (2). 52 Myself (2).

Again we give our readers one of our straightforward crossword puzzles. It is contributed by a reader, B. J. Longhurst, and every word in it can be found in standard dictionaries. The competition is divided into sections for Home and Overseas readers, in each of which prizes of 21/–, 10/6 and 5/– will be given for the best solutions. If necessary the judges will take neatness and novelty into consideration when making their awards. Consolation prizes will be given for other meritorious efforts.

Entries should be addressed "*June Crossword Puzzle, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section: 30th June; Overseas Section: 30th October, 1943.

What Railway Vehicles are These?

Readers of the "*M.M.*" will be surprised to learn that the mysterious names given in the panel on this page represent rolling stock of various kinds that can be seen on our railways. Yet this is so. For our June competition we are setting enthusiasts a very easy task, for all that we have done is to mix up the letters in the names of a large assortment of railway vehicles, including vans, wagons, boxes, trucks, cars, etc. In all cases two words are required to describe the vehicle, except for one where three are necessary, and in each case the individual words in the name have been kept separate. For instance, in the first example KEABR AVN, the second word immediately suggests a van of some kind, and attention to the first word soon shows that the vehicle here is BRAKE VAN.

All that competitors are asked to do is to make out a list of the correct names in the number order given in the panel. To this they should add their names and addresses, and the list should then be posted to "*Railway Vehicles Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Neatness and originality will be taken into account if there is a tie for any prize.

All readers of the "*M.M.*," whether they are members of the H.R.C. or not, are eligible for this contest. There will be two sections, for Home and Overseas readers respectively, and in each prizes will be awarded of 21/–, 10/6 and 5/–, together with consolation prizes of 2/6 each, for the best entries in order of merit. The closing dates are 30th June in the Home Section, and 30th October in the Overseas Section.

1. KEABR AVN.	9. WOPDERNUG AVN.
2. EIBGO TLSOREB.	10. NGLO BETU GNOAW.
3. LIDEOROCC OGNAW.	11. FERGIRERTARO AVN.
4. LUSDETANI ANV.	12. TSLAABL NWGAO.
5. SALTLAB EBARK.	13. OEHRS OBX.
6. ERBANWDKO ECNRA	14. TCALET CTUKR.
7. PRPHOE GONWA.	15. KECO GAONW.
8. TFLA TKURC.	16. NKTA RCA.

June Photo Contest

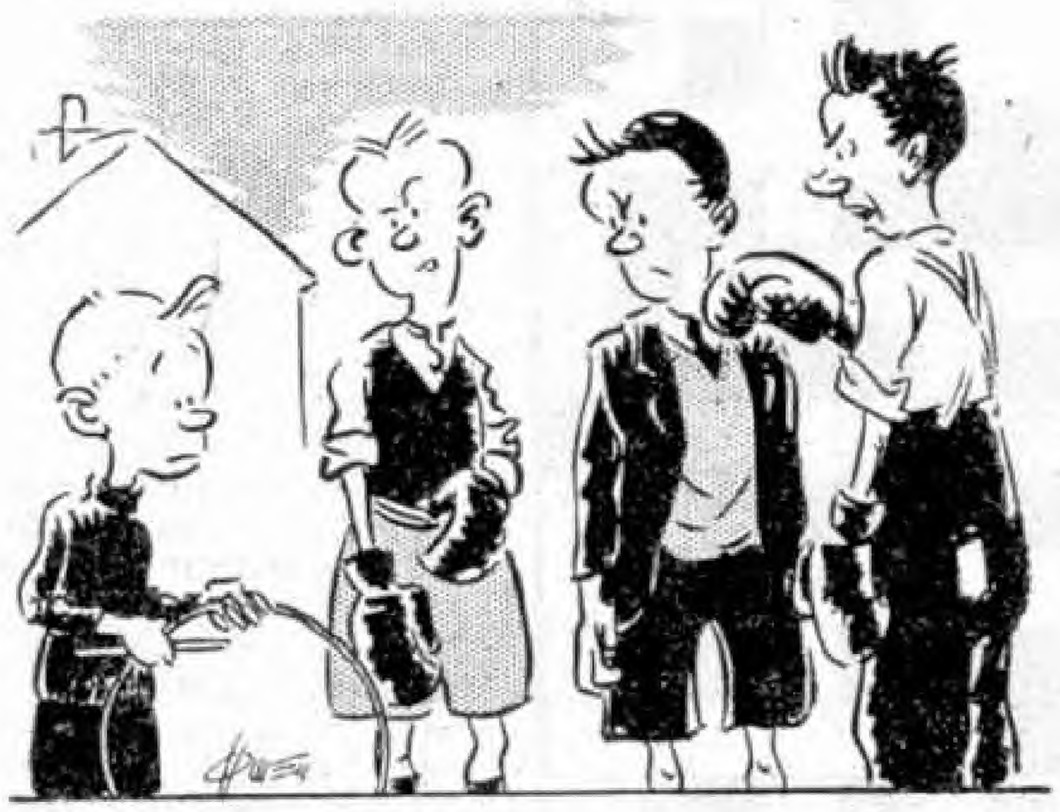
This month's contest is the 6th of our 1943 series, and in it, as usual, prizes are offered for the best photographs of any kind submitted. There are two conditions: 1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired, but entries in which the second condition stated above is not observed will be disqualified.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed "*June Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" There will be separate sections for Overseas readers. In each section prizes of 15/- and 7/6 will be awarded, together with consolation prizes. Closing dates: Home Section, 30th June; Overseas Section, 30th October.

Fireside Fun

"Does your daughter play on the piano?"
"No sir. She works on it, pounds on it, rakes it, scrapes it, jumps on it and rolls on it, but there's no play about it."

* * * *



"Young 'Erb's not refereeing this fight. He can only count up to seven."

* * * *

"How fast are your new aeroplane carriers, sailor?"
"We don't really know yet, lady. All they've been asked to do so far is to keep up with the 'planes."

* * * *

Auntie: "When I was a little girl I was told that if I pulled faces I would stay like it."
Niece: "Well, you can't say you weren't warned, auntie."

* * * *

ALL CORRECT

One ear to another: "Funny we haven't met. We live on the same block."
Boots to the cowboy: "You ride, I'll go on foot."
One light to another: "Let's go out to-night."

* * * *

Mother: "What are you looking for in the pantry, Bob?"
Bob: "Nothing, Mother."
Mother: "Well, you will find it in the cake tin."

* * * *

"Private Jones, wasn't this floor washed this morning?" angrily asked the sergeant.
"No," was the reply.
"No what?" barked the sergeant.
"No Mop."

* * * *

"What about your will power, man?"
"What about 'is won't power, sir?"

BRAIN TEASERS

Can you arrange five pennies so that each touches the other four? (T.K.C.)

* * * *

A TONGUE TWISTER

When you have finished juggling with coppers say this 10 times as quickly as you can: "*Five fat flat flapjacks.*" Follow this up by "*Salt comma; pepper comma.*" All who succeed in saying these quickly without getting confused are then privileged to invent and submit other tongue twisters with which to tease "*M.M.*" readers.

* * * *

TRY THIS ON YOUR FRIENDS

Ask one of your friends to think of a number less than 12. Then tell him to multiply it by 3, add 11, multiply by 4, add 6, multiply by 2, subtract twice the number he originally thought of, divide by two and tell you the result. To find out the number that he originally thought of, you have only to subtract 50 from the number he gives you, and divide the result by 11.

Can you figure out how this rule works? (T.K.C.)

* * * *

"Only one ticket for two of you?"
"That's right. We're half sisters."

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

To find the numbers that the smart policeman in our first puzzle remembered in such a roundabout manner all that is necessary is to try such numbers as 1234, 2345, etc., in each case adding the number formed by reversing the digits, and subtracting the the result from 12,300. The second of the numbers, 2345, added to 5432 gives 7777, and this subtracted from 12,300 leaves 4523, in which the same digits are mixed. The three numbers therefore were 2345, 5432 and 4523.

The eight aeroplane names in our second problem are: "Typhoon"; "Stormovik"; "Messerschmitt"; "Whirlwind"; "Mosquito"; "Tomahawk"; "Thunderbolt"; "Airacuda."

The lazy fly puzzle was a catch. On reading that it did not wish to crawl further than was necessary most solvers begin calculating crawling distances round the walls, on the floor or over the ceiling, to find the least. Following out its wish, however, the fly flew—straight to its destination. The distance is easily calculated to be 31.62 ft.

* * * *

THIS MONTH'S HOWLER

Propaganda is the name given to a well-behaved male goose.

STAMP ADVERTISEMENTS

(continued from pages 210 and 212)

This Month's Special Articles

MECCANO MAGAZINE

Registered at G.P.O., London, for transmission by Canadian Magazine Post.

EDITORIAL AND ADVERTISING OFFICE:
LIVERPOOL 13, ENGLAND.
Telegrams: "Meccano, Liverpool."

READERS' SALES AND WANTS

SALES

Volume III "Aeroplane Spotter," in good condition; what offers?—21, Hill View Road, Minehead, Somerset.

Over 2,000 genuine Foreign and Colonial Stamps in Album; all different; catalogued over £10; offers.—L. Flack, 6, Houghton Road, St. Ives, Hunts.

Britain's Model Farm; Hornby Clockwork Trains. Particulars—Bell, Newnham Hill, Basingstoke, Hants.

Bowman Steam Loco.; very strong hauling power; pre-war price, £2/10/–; fire box and pistons missing; price £1.—191, Baker Street, Enfield, Middlesex.

Webley Air Pistol .177 and Pellets, 55/–; Hockey Stick, 10/6; pair powerful Binoculars, 55/–; set Children's Encyclopædia, 85/–.—G. Buckland, Brookhouse, Turnford, Herts.

Everything first class: Clockwork, Electric, Hornby, Bassett-Lowke Trains and Components; Boats; Red-Green Meccano; Cameras. Could be viewed Bromley, Kent. Mention requirements. Enclose stamp.—Carpenter, Red Roof, South Heath, Gt. Missenden, Bucks.

WANTS

Vol. I "Shipping Wonders of the World" and Parts 36 and 37; also 50 Meccano Nuts/Bolts; state reasonable prices.—Miller, 3, Burleigh Road, Copnor, Portsmouth, Hants.

"Meccano Magazines" Sept., Nov. and Dec. 1942; also Meccano Magic Motor; good condition essential.—Kirk, 16, North Street, Beeston, Nottingham.

"0" Gauge Clockwork Mechanisms or Locomotives, broken spring or ratchet, preferably large; particulars and prices to—Lynthorpe, 8, Whalley Road, Manchester 16.

One Pair Twin Trix Electric Points wanted; good condition; please state price.—Bennett, 2, Lancelot Road, Hainault, Ilford.

Meccano Magic Motor or Set 3a in good condition.—Walker, Alandale, Smugglers' Lane, Bosham, Sussex.

"Meccano Magazines" Jan., Feb., Mar., April 1939; "Railway Magazine" July 1940; "Model Railway News" Feb. 1942.—Moore, 84, Crofts Road, Harrow, Middx.

Any Dinky Toy Cars, preferably Lorries; write, sending particulars and price.—Duncan, Normandale School, The Liberty, Wells, Somerset.

Good second-hand Sheath Knife; must be in good condition; state price and whether available on approval.—Stuttaford, Benares Hotel, Northfield Road, Minehead, Somerset.

No. 0 L.N.E.R. Tender, Hornby; Pair Parallel Points, Clockwork, Right or Left-hand; No. 25 L.N.E.R. "Bramham Moor" and Tender, Clockwork; Tank Wagon, "Colas" or "Nestlés"; Fish Van, any company; Meat Van, any company; also "M.M." for November 1940. Must be in good condition. Will pay reasonable prices.—D. A. Wight, Morestead House, Morestead, Nr. Winchester, Hants.

Dublo Electric Tank Loco.; Two Left and One Right-hand Clockwork Points.—Knight, 3, Louis Road, Orchards, Johannesburg.

Two No. 2 G.C. Corridor Coaches; One No. 2 Corridor Brake Van, Hornby L.N.E.R., in good condition; state price.—Brown, Edgehill, Wood Street, Greenock.

Meccano Super Model Leaflets in good condition. Nos. 1A, 2, 4, 5, 6, 14A, 16A, 18, 19, 19A, 20, 21, 24, 25, 27, 28, 29, 30, 35, 36. State price.—Harrington, "Meaford," Uppingham Road, Leicester.

Super Model Leaflets Nos. 1, 19, 22, 27 and 37; Two Reed Hooks, No. 105.—Trevor, 2, Oakfield Terrace, Cuckoo Lane, Gateacre, Liverpool.

Hornby 20 volt E320 or E220 Engine-Tender Gauge "0," Points, Straight Rails, 2 ft. Radius Curved Rails, Terminal Connecting Plates, Transformer, Controller. State prices.—L. Ayres, 56, Eaton Road, Brynhyfryd, Swansea.

PUBLISHED BY MECCANO LTD., BINNS ROAD, LIVERPOOL 13, ENGLAND
Printed by John Waddington Ltd., Leeds and London.